IDENTIFICATION OF ENGLISH LANGUAGE PROFICIENCY OF AIR TRAFFIC CONTROLLERS IN THE LATIN AMERICAN REGION

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__Introduction__

The purpose of this thesis is to describe the English language proficiency of Air Traffic Controllers (ATCOs) in Latin America, based on the examinations applied by the author in Nicaragua, Panama, Peru and Bolivia, using the Test of English for Aviation (TOEFA), that is a test designed according to the Rating Scale of the International Civil Aviation Organization (ICAO), as well as its Holistic and Linguistic Descriptors.

With this information, it will be possible to design and focus the training of this population in this Region, according to the results obtained and it will also be useful for the design of appropriate training materials that could privilege the practice of the identified weak linguistic areas of proficiency. In this way it would be possible to obtain all the required language competencies for a good performance of aeronautical functions as soon as possible.

During these diagnostic examinations the author observed that there were common characteristics of this population, regarding their language proficiency and their command of the six linguistic skills of the ICAO Rating Scale (pronunciation, structure, vocabulary, fluency, comprehension and interaction).

There was also some bias in the academic field, about the command of the English language of this population (on the six linguistic descriptors of the ICAO Rating Scale) because many people in charge of English for

Aviation training and testing thought that the main or only linguistic problem faced by Air Traffic Controllers in Latin America was related to pronunciation. Therefore, this study will analyze the validity of this criterion, based on the results obtained by the Informants on these tests.

The data corresponds to information obtained through examinations to Air Traffic Controllers. The analysis of the data will be based on the percentages of success or failure obtained by the test takers in all the six levels of the rating scale used for this purpose.

As a means of standardization, all the air traffic controllers have been examined according to the ICAO Rating Scale (presented in *Appendix 1* of this document) and the holistic descriptors shown in *Appendix 2*.

Other important tools for global harmonization are the *ICAO Document 9835: Manual on the Implementation of ICAO Language Proficiency Requirements*, published in 2004, the *ICAO Circular 318: Language Testing Criteria for Global Harmonization*, published in July 2008 and the *ICAO Circular 323: Guidelines for Aviation English Training Programmes*, published in 2009.

This is the first investigation in this field, since the request for the application of these new ICAO language proficiency requirements was established in March 2003, with a deadline for March 2008; although a three year extension has been granted in some cases, until March 2011.

So, this is a pilot study about the English language proficiency of these persons that use this language as a means to communicate in the aeronautical radio frequencies.

This is a relatively new approach in the English for Specific Purposes area, which is specifically addressed to English for Aviation. It not only covers the Aeronautical English Phraseology but also the plain English (used in an aviation context), as it will be explained in this document.

According to ICAO recommendations *(Document 9835. Pages 6-5. Item 6.6.3.: Appropriate aviation language testing)* the methodology applied

in the TOEFA examination is trough a face-to-face interview, with the following critical characteristics:

a) a proficiency test of speaking and listening;
b) based on the ICAO Rating Scale and the holistic descriptors;
c) test speaking and listening proficiency in a context appropriate to aviation; and
d) test language use in a broader context than in the use of ICAO phraseologies alone.

The results of the examinations applied and compiled for this thesis will be presented in the form of Practical Cases.

In Chapter I the investigation outlines are presented, mentioning the problem of this study and the questions to be solved. The rationale and the objectives of the thesis are also presented and explained here.

So, this a very important chapter, because here are the questions that we have to answer through the investigation, based on the results obtained on the field (using the TOEFA examinations) with the purpose to get the information that will help us to arrive to the conclusions of the thesis.

In Chapter II it is possible to review the theoretical framework of the thesis, especially in aspects related to the specific English for Aviation field and the characteristics of the ICAO standard and the TOEFA examination.

The main objective of this chapter is to explain all the details of the very specialized field of Aviation English and how it is related to English for Specific Purposes (ESP) and English for Academic Purposes (EAP).

This chapter is also important because it explains the main reasons why the ICAO language proficiency requirements were implemented and it shows the ICAO rating scale, which is the global standar for examinations of pilots and air traffic controllers around the world since March 2008.

Aviation context is a very relevant characteristic of language testing in the professional scenario we are talking about and that is why this important issue is explained in this chapter, because it is the main difference between general and aviation English. Additionally, the areas of English competency for aviation personnel, are also explained.

Another important information provided in this chapter is related to the characteristics of the TOEFA examination and the linguistic considerations for its construct and further use during the experiences done in Nicaragua, Panama, Peru and Bolivia.

Chapter III is dedicated to the methodology of the investigation, regarding informants, materials, procedures, analysis and presentation of four practical cases.

This chapter is also important because we can find the general demographic characteristics of the informants, which is also a good information to have in account for the analysis of the results obtained by these persons.

The materials used, as well as the procedures applied, are also presented in this chapter, in order to have a general idea of the scenarios where the examinations were performed and the instruments that were used.

The most important part of this chapter is related to the four practical cases that are shown here, because they present the results that will be analyzed in order to arrive to the final conclusions of this investigation.

The chapter also shows the descriptive summaries of the results obtained in each of the four countries where the tests were applied, presenting this information in a graphic form, which is good for any reader.

The discussion of results is carried out in Chapter four, mainly about the answers to the questions raised at the beginning of this study, regarding pronunciation as the only or main problem of the population investigated, and the consequences of the answer to this question when preparing a training program.

According to the results found in this investigation, we can also answer the question concerning the average proficiency in all the other five skills examined: structure, vocabulary, fluency, comprehension and interactions.

Then, the wash back effect of the test used (TOEFA) is analyzed. This is also a very important issue of this study, because some remedial training has to be applied in order to improve the language proficiency of the informants that are below the Operational level 4 of the ICAO rating scale.

Finally, the conclusions and recommendations of this study are presented, regarding topics as the training approach that should follow Latin American air traffic controllers in order to improve their language proficiency, diagnostic information about this proficiency, and the importance that it has for operational safety in the aviation field. The ethical issue is also mentioned, since it is a very important element of the whole system.

The bibliographical references are shown at the end of the thesis, as well as the appendices that are necessary to give additional details to the different aspects mentioned in the body of this document.

A CD Rom with very important electronic information is attached as *Appendix 6*. This material is very important to understand some characteristics of the Air Traffic Control field, as well as details of the main reference documents about this ICAO standard.

The electronic version of this thesis is also recorded in this CD Rom and some samples of interviews, pictures and audio used during the tests. This information will be very useful for English Teachers who are not familiar with the aviation context where the examinations are performed.

The purpose of this investigation is to present as much evidence as possible, about the linguistic proficiency of Latin American air traffic controllers; in order to provide English teachers with tools that can be useful for them when working in this very interesting aviation field.

CHAPTER I: Investigation Outline

1.1. Problem statement

The main problem for the implementation of ICAO language proficiency requirements is the lack of information about the actual level of English proficiency (according to the ICAO language proficiency requirements) of Air Traffic Controllers (ATCOs) in the 190 ICAO Contracting States around the world.

This is due to the fact that before this requirement, they were tested only in their ability to use the Aeronautical English Phraseology, which is a very technical terminology used in the aeronautical radio-communications.

The first step of any implementation program is to apply diagnostic examinations in order to know the real level of language competencies of the aeronautical personnel and with this information to be able to design tailor-made training, with the purpose to optimize the English language proficiency of these personnel, using plain English in an aviation context, with the final goal of improving aviation safety, by diminishing the possibility of accidents caused by lack of understanding of the English language.

Therefore, the questions to be solved by this study are the following:

a) Is pronunciation the only problem that we have to address?
b) Should we prepare a training program based mainly on pronunciation issues?
c) What is the level of language competencies in the other five skills examined?
d) What is the *wash back* effect of the examination to design the appropriate training?

The first two questions are the result of several years of debates in the professional English for Aviation fora. Most of the experts (linguistic and operational) believe that the main obstacle for Latin American Controllers to "negotiate for meaning" is their strong L1 accent and the fact that they are heavily influenced by native or almost-native pronunciation, when exchanging communications with pilots whose first language is English.

Furthermore, this thesis will provide the answers to these questions, based on the observations and conclusions of the tests applied in Nicaragua, Panama, Peru and Bolivia, which are representative countries of the Latin American population of Air Traffic Controllers.

We will also obtain the answer to the third question, since the tests judge the language proficiency of test-takers in all six skills of the ICAO Rating Scale.

According to the results of the tests (because the TOEFA examination has a good *wash back* effect), we could establish guidelines for appropriate training design, in order to optimize the language proficiency of ATCOs in the Latin American region. This is very important, considering the high stakes and consequences involved in these testing processes, when applied for licensing purposes.

1.2. Hypothesis

Since it is a new research, with a descriptive approach, no hypotheses have been presented, because the main objective is to analyze the data regarding the English language proficiency of Air Traffic Controllers, with the purpose that this information could be used for the design of training alternatives and further research in the field of English for Aviation, which belongs to the area of English for Specific Purposes.

However, enough evidence will be provided, as to have the appropriate answers to the four questions mentioned in the previous page, and in doing so, the conclusions of this study would be very useful for the English Teaching profession in general, the international community of English for Aviation training and testing providers, as well as for all the stakeholders involved in this international standard.

1.3. Rationale

Since the tool for the diagnostic tests was the Test of English for Aviation (TOEFA), it is very important to analyze the issues related to the test construct, as to arrive to the conclusion that it has been designed to measure speaking and listening abilities of test-takers in an aviation context, as mandated by this international standard.

The test tasks and items were developed according to the guidelines mentioned in ICAO Document 9835 and the examinations were conducted during the years of 2005, 2006 and 2007, working with a population of 331 ATCOs (35 in Nicaragua, 94 in Panama, 113 in Peru, and 89 in Bolivia).

This population corresponds to almost the total amount of Air Traffic Controllers in these countries and that is why it is a very good representative sample of the total population of these professionals in Latin America, because they share similar characteristics, due to the fact that they perform very technical and standardized activities.

For the construct of the TOEFA test all the recommendations of the Appendix B of the ICAO Document 9835 were applied in a broad sense and also for specific linguistic issues.

In this appendix, which is titled *"Aviation Language"*, we have guidance about communicative language functions, events, domains and tasks associated with aviation; priority lexical domains, language tasks for ATCOs and the top 250 four-word clusters in spoken English.

1.4. Objectives

The **primary objective** of the observation and analysis of test results is to find an answer to the common bias that the main linguistic problem of this population is pronunciation, which is one of the six language skills examined through the ICAO Rating Scale.

The **secondary objective** is to know the real level of this population in the other five skills of the ICAO Rating Scale, what is a consequence of the study of the primary objective, since the tool applied (the TOEFA examination) allows for judging proficiency in all six levels and skills of that linguistic scale.

As consequence of these two objectives, the **third objective** is to get relevant information for the design of English for Aviation training for this population, which is very important, considering the fact that these personnel work in different working shifts, so it is not possible for them to study in regular schedules of language institutes.

So, to adapt the training to their real language necessities will be very useful for the reduction in the time necessary to get the competencies required by this international standard.

Photo 1.-*The TOEFA examination was first presented in Montreal, Canada, during the International Aviation Language Symposium (IALS) in 2004 and applied for the first time with Nicaraguan Air Traffic Controllers in 2005.*

CHAPTER II: Theoretical Framework

2.1. English for Specific Purposes (ESP)

According to the definition of Dudley-Evans (1998): "ESP should be seen simple as an approach to teaching and an attitude of mind". Also, Hutchinson et al. (1987:19) state: "ESP is an approach to language teaching in which all decisions as to content and method are based on the learner's reason for learning".

What is very important in the definition of ESP by Dudley-Evans is the identification of absolute and variable characteristics, as follows:

Absolute Characteristics:

1. ESP is defined to meet specific needs of the learners;
2. ESP makes use of underlying methodology and activities of the discipline it serves;
3. ESP is centered on the language appropriate to these activities in terms of grammar, lexis, register, study skills, discourse and genre.

Variable Characteristics:

1. ESP may be related to or designed for specific disciplines;
2. ESP may use, in specific teaching situations, a different methodology from that of General English;
3. ESP is likely to be designed for adult learners, either at a tertiary level institution or in a professional work situation. It could, however, be for learners at secondary school level;
4. ESP is generally designed for intermediate or advanced students.
5. Most ESP courses assume some basic knowledge of the language systems.

This separation of characteristics is very useful to have a clear notion of what is ESP, especially in this study, where we are talking about a very specific field of professional practice, as it is the case of the aviation field and the use of the English language, what some people call "English for Aviation" or "Aviation English".

2.2. English for Academic Purposes (EAP)

As established by K. Johnson & H. Johnson (1998: 105), English for Academic Purposes (EAP) deals with "the use of English in study settings, where the main goal of language learning is the ability to cope with the student's chosen academic specialism".

Although this branch of ESP is not very well known, generally it is associated as the training received by foreign students that are studying all their academic courses (for any professional or technical carrier) in English. For example, courses to prepare graduated high school students that will go to the United Kingdom in order to study in English.

Another important characteristic of EAP is the fact that the teaching content is matched to the requirements of the learners. For example, there are some articles and books written by Mackay & Mountford (1978) that look at specific EAP problems: listening, language for economists and study skills.

Something that is characteristic of EAP is the work that is necessary to do between the English professional and the subject matter expert, because otherwise it would be very difficult or maybe impossible to validate the training materials and course contents.

This issue is described by T. Johns and Dudley-Evans (1998), when mentioning that: "problems encountered by overseas students in the UK are rarely concerned with ´knowledge of the language´, or ´knowledge of the subject´ alone, but that these factors are inextricably intertwined" (p. 8).

This characteristic is also very important in English for Aviation and that is why I always recommend using this approach in order to assure good content validity for any didactic material used with the purpose to teach EAP to pilots and air traffic controllers.

So, EAP is also an important definition to take in account when referring to studies of the English language in an aviation context; which is one of the holistic descriptors of the ICAO language proficiency requirements for Pilots and Air Traffic Controllers.

2.3. Background for the Implementation of ICAO Language Proficiency Requirements

The necessity of strengthening the requirements for the English language proficiency of pilots and air traffic controllers came about because there were some accidents where investigators found that insufficient command of the English language on the part of the flight crew or a controller contributed to the chain of events leading to the accident.

For example, in the Introduction of ICAO Document 9835, they mention three accidents (one collision on the ground, one accident involving fuel exhaustion and one controlled flight into terrain) where 800 people lost their lives. They also mention that according to the United Kingdom's Mandatory Occurrence Reporting

Systems, there were 134 language-related problems in fewer than six years.

As a result, ICAO Member States and some other organizations were worried about the way to address this linguistic problem and that is why this concern led to the 1998 ICAO Assembly Resolution A32-16[1], where:

> "The ICAO Council was urged to direct the Air Navigation Commission to consider this matter with a high degree of priority, and complete the task of strengthening relevant ICAO provisions concerning language requirements, with a view to obligating Contracting States to take steps to ensure that air traffic control personnel and flight crews involved in flight operations in airspace where the use of the English language is required, are proficient in conducting and comprehending radiotelephony communications in the English language."

To address this objective, the Proficiency Requirements in Common English Study Group (PRICESG) was created in the year 2000 and its members were operational and linguistic experts that were in charge of the elaboration of the ICAO Language Proficiency Rating Scale, as well as the guidelines for implementation, that were presented through the ICAO Document 9835 during the first ICAO Aviation Language Symposium, held at ICAO headquarters in Montreal, Canada, on September 2004; where the informant also participated as Speaker.

It is important to mention that the examination TOEFA, which is a Peruvian testing tool, was the first test presented to the aeronautical community, in this Symposium, in order to address the necessity to assess the language proficiency of pilots and air traffic controllers, according to the ICAO rating scale.

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[1] ICAO Document 9835: *Manual on the Implementation of ICAO Language Proficiency Requirements*, p. 1.

As they mention at the Introduction of the above mentioned ICAO Document 9835[2]:

> "The ICAO language proficiency requirements cannot completely eliminate all sources of miscommunication in radiotelephony communications. Rather, the goal is to ensure, as far as possible, that all speakers have sufficient proficiency in the language used to negotiate for meaning, in order to handle non-routine situations. Communication errors will probably never be completely eliminated; however, compliance with the ICAO language proficiency requirements will enable speakers to more readily recognize errors and work towards the successful and safe resolution of misunderstandings."

On this point, it is important to clarify that English requirements have always been part of the competencies of pilots and air traffic controllers, but it was only a recommendation issued by ICAO to all the 190 Contracting States.

However, the main difference with this standard is the fact that after March 5th, 2008 it is a compulsory requisite, so the aeronautical personnel that are not able to accomplish with it will not continue working as pilots or air traffic controllers, at least in international operations.

I think that it was a necessary action because otherwise safety could be in danger and states have taken all the convenient actions in order to train their aeronautical personnel as not to have any problems with these requirements, although there will be some people that due to different factors (age, lack of time, lack of good teaching and testing alternatives, etc.) will not be able to achieve it on time, even in the cases where ICAO has extended the deadline to March 2011.

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[2] ICAO Document 9835: *Manual on the Implementation of ICAO Language Proficiency Requirements*, pp. 1-3.

2.4. The ICAO Rating Scale

The ICAO Rating Scale contained in the *Appendix 1* of this thesis has six levels of language proficiency, from Pre-elementary (Level 1) to Expert (Level 6) and with six areas of linguistic description: pronunciation, structure, vocabulary, fluency, comprehension, and interactions.

One of the important aspects to take into account with this scale is the fact that the intervals are not equal, because the training time necessary to progress from one level to the other is variable and it depends on several aspects of the individual.

This scale describes specific characteristics of language use and they are presented in a way that raters can differentiate between one level and another.

Another important characteristic of this rating scale is the fact that it does not make any reference to "native" or "native-like" speakers, because, as they say[3]:

> "All participants in aeronautical radiotelephone communications must conform to the ICAO proficiency requirements, and there is no presupposition that first-language speakers necessarily conform. An additional reason for avoiding the use of the term "native" language or referring to a "native" speaker is because of the proven difficulty in defining just precisely what a native speaker is."

It is important to notice that when using English for Aviation, most of the time the English language is used by non-native speakers. For example, a German pilot flying to Lima, Peru and speaking in English with a Peruvian controller, which first language is Spanish.

To understand each other, they use the English language, and that is why this language is known as the language for aviation and it is

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[3] ICAO Document 9835: *Manual on the Implementation of ICAO Language Proficiency Requirements*, pp. 2-9.

mainly used in its international version, which is different from the version of a native speaker.

The minimum satisfactory level is the Operational Level 4, which should be obtained by the candidate in all the six categories of the rating scale. This is due to safety reasons, because if a person is not proficient, i.e. in pronunciation, he/she could have problems in communications when using the radiotelephony, as a pilot or as an air traffic controller.

In aviation, these miscommunications are always possible to occur. In his graduate thesis *Miscommunications in Air Traffic Control*, David McMillan (1998:13) points out that "errors in communications and co-ordination are causal factors in failures within the air traffic system and the flexibility of the system depends upon the highly dynamic information passed by voice between controllers and pilots." This problem is greater for those that have a poor command of English but, as Morrow (1997:28) observes, "there is a hidden threat from those who take their fluency for granted."

2.5. Linguistic awareness

In aviation English scenarios we have to be aware that communications are cross-cultural most of the time and they are performed between speakers of different native languages.

So, it is very important for native speakers of the English language, to be aware of this situation, in order to use adequate strategies and enhance cross-linguistic comprehension, to minimize the risks inherent in voice aeronautical radio-communications, to avoid miscommunications that could cause aviation incidents and accidents.

The ICAO language proficiency requirements apply both to non-native and native speakers of English. However, most of the effort to improve their linguistic performance has fallen mainly on non-native speakers.

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Nonetheless, native speakers have an ethical obligation to improve their linguistic awareness, considering the fact that they are communicating with people whose first language is not English, so it is logical to assume that native speakers should take special care in the delivery of messages when working in international linguistic scenarios.

It is especially true when talking about stressful situations that could occur when a pilot is facing urgent or distressing situations or when several aircraft are approaching a very busy airport. As it is mentioned by Brian Day[4]:

> "Language is an imperfect medium for communication, but with greater awareness of basic linguistic principles, operating personnel can be motivated to adhere more closely to standard phraseology in all air-ground radio exchanges, thus enhancing safety."

The importance of this linguistic awareness can be understood by always keeping in mind the disastrous results of various accidents which have occurred in the history of aviation, caused by a lack of proficiency or capacity to manage or understand radio-communication exchanges, as mentioned by Elizabeth Mathews[5]:

> "In March 1977, the worst disaster in aviation history occurred when a controller and pilot, both speaking English as a second language, failed to communicate critical information. As a result, the Boeing 747 crew attempted to take off in low visibility conditions, colliding with another 747 already on the runway."

> "In 1990, Avianca Airlines Flight 052, inbound to New York's John F. Kennedy International Airport, crash when it ran out of fuel. The U.S. National Transportation Safety Board (NTSB) determined that the probable cause of the accident was "the failure of the flight crew to adequately manage the airplane's fuel load, and

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[4] International Civil Aviation Organization (2002). ICAO Journal. Volume 57. Number 3. Montreal. p. 24.
[5] International Civil Aviation Organization (2003). ICAO Journal. Volume 58. Number 4. Montreal. p. 7.

their failure to communicate an emergency fuel situation to air traffic control before fuel exhaustion occurred."

"In 1995, an American Airlines Boeing 757 approaching Cali, Columbia, turned off course, crashing into a mountainside and killing all on board. The air traffic controller later told investigators that the flight crew's last reported position was incongruent with what he understood the aircraft's position to be, but that he did not know how to convey his concern to the crew in English."

In the same article, Elizabeth Mathews also established that: "What these accidents have in common is that in each case safety investigators found that insufficient English language proficiency on the part of the flight crew or a controller had played a contributing role in the chain of events leading to the accident. In addition to these high profile accidents, other accidents, multiple incidents and near-misses resulting from language problems are reported each year."

It is also very important for English teachers to know and be aware of the importance of this training process for their pilots or air traffic controllers (ATCO) students, considering the high stakes that they have to face when performing their everyday duties using the aeronautical radio-communications.

2.6. Aviation Language Testing

A very important aspect of this ICAO standard is the fact that it is always required to have an aviation context for testing (work-related proficiency), being this characteristic the main difference between general and aviation English language testing.

It is also very important to remember that we are not talking about phraseology-only testing but we are dealing with plain English (in an aviation context), so we are talking about proficiency tests of speaking and listening abilities.

The purposes of an aviation language test should be to verify the language proficiency of pilots and ATCOs, according to ICAO

language proficiency requirements, as well as to evaluate the learning effects of language training applied to those professionals.

Another characteristic is the fact that we are talking about a high stake test, as mentioned at ICAO Document 9835[6]:

> "Tests can be categorized as high stakes depending on how significantly they impact the life of the candidate or other stakeholders. When the results of a particular test determine or limit professional and career options, the stakes are high for the candidates."

It is also important to mention that what the use of the ICAO rating scale really means for the aviation world is to have a standardized tool to measure the English language proficiency of pilots and ATCOs around the globe, which is always a great advantage.

This testing standard also requires recurrent tests, depending on the proficiency demonstrated by the candidates. ICAO recommends that a person in level 4 should be retested every 3 years and a person in level 4 should have a recurrent test after 6 years. In the case of a candidate with level 6 it will not be necessary to re-evaluate them again.

As mentioned by Elizabeth Mathews[7]:

> "Recurrent testing of pilot and controller language skills is important for two reasons. Firstly, we know that language skills slip if people do not have the opportunity to use and practice them. Conversely, at a certain level of proficiency people do not lose these skills. Retesting is particularly important for individuals with intermediate levels of proficiency who live in places which offer them little opportunity to use their second language."

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[6] ICAO Document 9835: *Manual on the Implementation of ICAO Language Proficiency Requirements*, pp. 6-2.
[7] Mathews, Elizabeth (2004):"New provisions for English language proficiency are expected to improve aviation safety", *ICAO Journal* 59. Number 1, p. 4.

So, when talking about best practices for language testing in aviation, we have to consider all these characteristics and test providers should also apply them based on good language testing principles and practices. For the case of this ICAO standard, they include the International Language Testing Association (ILTA) Code of Ethics for languages testers, as part of Document 9835 (Appendix D).

It is also advisable for a good practice in language test development to have all stakeholders participating in this process. In this particular case, we are talking about pilots, controllers, administrators, operational trainers, aviation language teachers and qualified linguists.

As it is also mentioned at ICAO Document 9835[8]:

> "Other essential elements of the test development process, with input from all stakeholders, include writing test specifications; deciding test method and content; developing test items; trialing the items; analyzing the results; revising test items; re-trialing the test and test items; validating the test; establishing a rating procedure; establishing a rater training process, and establishing record-keeping administrative functions."

And what is also very important for this kind of testing is the performance of testers and raters. According to this ICAO standard[9]: "Best practice in language proficiency assessment call for at least two trained and calibrated raters, at least one of whom is a language teacher."

As requested by ICAO in Circular 318[10], raters should also complete recurrent training, at least once every year, mentioning

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[8] ICAO Document 9835: *Manual on the Implementation of ICAO Language Proficiency Requirements*, pp. 6-4.
[9] ICAO Document 9835: *Manual on the Implementation of ICAO Language Proficiency Requirements*, pp. 6-5.
[10] *International Civil Aviation Organization* (2008). Circular 318: Language Testing Criteria for Global Harmonization, p. 37.

that it is important because: "Initial and recurrent training aiming to standardize rater behavior is vital to objectivity. As a language testing standard, raters should undergo approximately 40 hours of initial rater training and 24 to 40 hours of recurrent training per year."

2.7. Areas of English competency for aviation personnel

When talking about safe aeronautical radio communications, we should identify three areas where pilots and ATCOs need to demonstrate competency when using the English language: air traffic control (ATC) phraseology, English for Specific Purposes (ESP), and English for General Purposes (EGP).
Each of them plays a very important role in the performance of these persons and they are also very important variables when selecting training and testing strategies.

2.7.1. ATC Phraseology

The aeronautical phraseology used for radio-communications between pilots and air traffic controllers is taught in flight training schools or civil aviation training centers (CATC) at the basic schooling of these professionals.

It is used as the main way of communication around the world and to be able to use it effectively it is necessary to have a good knowledge of the aeronautical procedures that they refer to because their meanings are not similar to the ones used in general language scenarios.

As it is mentioned by Marjo Mitsutomi[11], from the University of Redlands, in USA:

"The phrases used in radiotelephony are designed to make the communicative function between the ground and aircraft as

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[11] Mitsutomi, Marjo (2004): "Fundamental aviation language issues addressed by new proficiency requirements", *ICAO Journal* 59, Number 1, p. 7.

concise and brief as possible, with the emphasis on accurate content as opposed to linguistic form."

"Typically, grammatical markers, such as determiners ("the" or "a") and auxiliary verbs are deleted, a feature making ATC communications markedly different from natural language."

As an example of the difference between aeronautical English phraseology and general language, we can show the following typical ATC clearance[12]:

"American Airlines 081 cleared for take off, runway 15, climb and maintain flight level 350, cross Lima (LIM) at or above flight level 050. Contact Lima approach control on frequency 121, 5. Squaw code 5711."

The aeronautical English phraseology normally works well and from my experience I can give testimony of pilots and ATCOs that worked for many years at the air traffic services without having any linguistic problem, just by using the ATC phraseology accurately, because they have memorized it.

But, when communications required working with unusual situations or plain language, they were unable to understand anything and that is why this ICAO standard reinforces the necessity to have a good command of the plain English language, in an aviation context. As it is mentioned by Mathews (2001:26): "the need for closer conformity to standard phraseology and for greater care in communication on the part of native and non-native speakers alike becomes readily apparent."

It is also important to mention that according to ICAO standards, when pilots and controllers can not communicate using the language of the ground station, they must use the English language, and that is why English is considered the language of aviation worldwide.

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[12] Example taken from the own experience of the author as an Air Traffic Controller.

To refer to standardized ICAO Aeronautical English Phraseology it is necessary to review the Chapter XII of ICAO Document 4444: Air Traffic Management.[13]

2.7.2. English for Specific Purposes in an Aviation Context

This area refers to the additional knowledge of vocabulary that pilots and controllers should have in order to manage some other non-routine communicative situations.

These expressions and vocabulary are closely related to their daily duties, although they are not official ATC phraseology. They are related to some other aviation fields like meteorology, flight dispatch, ground services, radio navigation aids, urgency and emergency situations, etc.

So, aviation personnel should be also competent in aviation related ESP, which is something that goes beyond routine ATC phraseology.

An example of this aviation ESP could be as follows[14]:

"N1234X the runway is blocked by cows at the moment. It is not advisable to land now. We will try to clear the runway as soon as possible. Confirm intentions."

It is an unusual situation and it could be a dangerous one if the pilot does not receive this information at the right moment and occasionally there have been cases when the air traffic controllers did not remember the name of the animals crossing or blocking the active runway, even when it is supposed to be a basic part of their English vocabulary.

To avoid a "linguistic stall", Mitsutomi (1999:351) says: "The pilot-controller dialogue requires language readiness that goes beyond the current assumption that ATC phraseology is sufficient. It is not."

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[13] International Civil Aviation Organization (2007). "Document 4444: Air Traffic Management". Montreal.
[14] Example taken from the own experience of the author as an Air Traffic Controller.

2.7.3.   English for General Purposes

Now it is when the issue of EGP appears, because when pilots and air traffic controllers have a good command of the general English language, they are able to "negotiate for meaning" at any circumstances and that is another very important goal of the ICAO language proficiency requirements.

The problem is that there is not a worldwide recognition of what is the minimum level of general English language necessary for successful aeronautical radio-communications at all possible scenarios.

As it is mentioned by Mitsutomi in her previously mentioned article[15]:

"The ability to communicate when there is no prescribed script (i.e. ATC phraseology) is critical to safety. In practice this means that pilots and air traffic controllers must be able to achieve mutual understanding through the use of plain or general language to get their messages heard and understood.

 It is precisely this issue of plain or general language use that has been problematic in the aviation context. Although strict adherence to phraseologies is always preferred, situations arise for which there is no adequate ATC phrase, or the phrase needs to be expanded with real-time information."

It is a very important issue nowadays. For example, Bozena Slawinska, who is one of the Vice-Presidents of the International Civil Aviation English Association (ICAEA) wrote on the ICAEA forum, on April 24th, 2010: "During the ILTA 32nd Language Testing Research Colloquium, Professor Dan Douglas reminded us of the important fact, which some current academic research and indeed some tests available have still not grasped, i.e. that "plain language" of ICAO documents is not general English, but non-formulaic language used in an operational context."

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[15] Mitsutomi, Marjo (2004): "Fundamental aviation language issues addressed by new proficiency requirements", *ICAO Journal* 59, Number 1, p. 9.

In my working experience, I prefer to agree with Marjo Mitsutomi[16] (2004:27) when finishing the above mentioned article with the following conclusion:

"Communicative competence in aviation English means that aviation personnel have common and standardized proficiency levels in the critical areas of highly specialized ATC phraseology, English for specific purposes as it applies to aviation, and the foundational general English. These three components together form the linguistic safety cushion that will significantly enhance safe communications in the aviation context worldwide."

Mitsutomi concludes with the following graphic as to represent the *Aviation English Model* that summarizes what is above mentioned:

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Aviation English Model
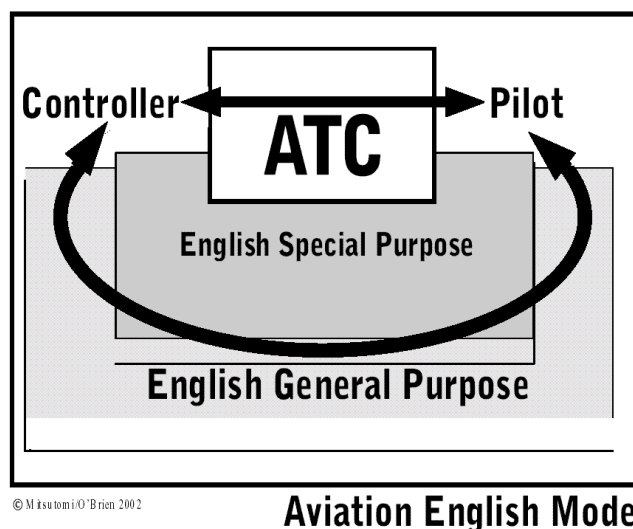
Figure 1: Aviation English model illustrates critical areas of English competency required for safe communications

(Source: ICAO Journal. Volume 59. Number 1, 2004)

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[16] Mitsutomi, Marjo (2004): "Fundamental aviation language issues addressed by new proficiency requirements", *ICAO Journal* 59, Number 1, p. 27.

This is a very important distinctive characteristic of the TOEFA examination, because it judges the competency of pilots and air traffic controllers in these three areas of language proficiency and I strongly think that this approach is more appropriate to strength safety in operational radio-communications.

I have also had the opportunity to follow up the operational performance of ATCOs that were evaluated following TOEFA procedures and they are able to "negotiate for meaning" even at unexpected situations, where General English also appears.

It is also something easy to confirm when supervising the performance of *ab-initio* ATCOs whose general English language proficiency has been a requisite to start their ATC studies, compared with those who only have a good command of ATC phraseology and ESP.

So, it is not only important to use valid and reliable tests, but to have enough evidence that these tests are able to predict future performance (wash forward effect).

2.8. Characteristics of the TOEFA Examination

The main TOEFA characteristics are the following:

Objective

The exam is designed to measure the English language proficiency level, in the abilities of speaking and understanding (at an agreed minimum level), of the aeronautical personnel that take part in the radiotelephony communications, with the purpose of contributing to the safety and regularity of the air traffic control services in the international environment in which they carry out the typical functions of their professions.

For this reason, there is a special emphasis on the use of the foreign language before the operational procedures, according to the holistic descriptors pointed out in the ICAO Rating Scale.

Linguistic descriptor 1: Pronunciation

The evaluation is carried out by means of an interview, with open questions, so that the candidate demonstrates that he is able to make himself understood, with a dialect or accent intelligible to the aeronautical radio-communications. The pronunciation, rhythm and intonation are evaluated, as well as the grade of interference with the ease of understanding.

Linguistic descriptor 2: Structure

Considering that the abilities of the language evaluated refer to the oral production of the English language, the practical application of the grammatical structures is evaluated, when the candidate answers to the questions posed by the language assessor(s), during the interview.

Consequently, the correct use of the pertinent grammatical structures is measured, as well as the structures of the sentences and the appropriate use of the functions of the language, according to the scenario in which they are used.

Linguistic descriptor 3: Vocabulary

This descriptor is also evaluated through the interview. The extent and precision of the vocabulary used by the candidate is judged, with the purpose of communicating efficiently about the variety of familiar and unfamiliar topics that are used during the communication with the language tester. The capacity of the candidate to use the appropriate vocabulary (to manage successfully in unexpected circumstances) is also evaluated.

Linguistic descriptor 4: Fluency

The fluency of the candidate to communicate is evaluated through the oral interactions with the Interlocutor, as well as the dialogues that are generated after listening to the audio files.

The capacity of the candidate to make himself understood with detail and with natural fluency is also evaluated, as well as the stylistic effects, accent, and conjunctions used to achieve an effective communication, about familiar, unfamiliar or unexpected situations.

Linguistic descriptor 5: Understanding

The candidates listen to dialogues and real communications of native speakers of the English language, from audio files, and they explain to the language tester (using the foreign language) the scenario or situation that he/she has just listened to; with the purpose of measuring their grade of understanding of the language and the linguistic variants (dialects and accents) or tones that are intelligible for the international community of aeronautical users.

Linguistic descriptor 6: Interactions

The capacity of the candidate to interact with ease in unexpected situations is evaluated, as well as his or her ability in capturing verbal and non-verbal indications and to respond appropriately to them, by means of immediate, appropriate and informative answers that allow him or her to manage the speaker/receiver relationship efficiently; verifying, confirming or clarifying appropriately, when it is necessary.

The language tester presents situations and unexpected scenarios, through aviation photos, to verify the consistency and coherence of the answers of the candidate, according to the outlined scenario, what also allows the tester to confirm the candidate's capacity to understand and his or her ability to interact appropriately.

The *Tasks and Test Items Format* of the TOEFA examination can be found in ***Appendix 3*** of this document. Additional information about the test can be seen at its Internet site: www.toefa.com .

For scoring purposes, we should remember what is established in this international standard: "An individual must demonstrate proficiency at least at Level 4 in all categories in order to receive a Level 4 rating". (Document 9835. Page 2-9. Item 2.8.4.: ICAO Rating Scale).

Regarding the issue of pronunciation, it is important to consider what is established as a satisfactory level (Operational level 4) for the skill of pronunciation at the ICAO rating scale: "Pronunciation, stress, rhythm and intonation are influenced by the first language or regional variation but only sometimes interfere with ease of understanding."

2.9. Linguistic Considerations for TOEFA Construct

For the construct of the TOEFA test, the following linguistic analysis and principles of language testing have been applied:

Competence -vs. - Performance

The first point of discussion is about competence versus performance. As established by Chomsky: "We thus make a fundamental **distinction between competence** (the speaker-listener's knowledge of his language) **and performance** (the actual use of language in concrete situations). Only under the idealization set forth in the preceding paragraph (...) is performance a direct reflection of competence. In actual fact, it obviously could not directly reflect competence. A record of natural speech will show numerous false starts, deviations from rules, changes of plan in mid-course and so on." (Chomsky 1965:4).

In this case, the test has been designed to judge the performance of the candidates instead of their competence and that is why it does not have discrete items about the knowledge of the language, because it is not the purpose of the test, as requested by the ICAO language proficiency requirements.

<u>Usage – vs. - Use</u>

In this case, the test uses samples of language use (in an aviation scenario) instead of usage, making it possible to predict the future performance of candidates, according to the test results, what is called the ***wash forward effect*** of the test. For validation purposes, the test results were compared with the real performance of ATCOs on their job and the results were very good ones.

<u>Direct – vs. - Indirect Assessment</u>

This is a direct test because it uses examples of performance as an indicator of communicative competence.

All the test tasks and items are directly related to aviation or work-related issues (the work of an air traffic controller) which are directly delivered to the candidate by the interlocutors/raters and also by using recordings obtained from real or simulated work situations.

It is also a direct test if we take into account the manner of delivery of the prompts and test items, which is done directly by the interlocutors/ raters. In the case of semi-direct tests, the prompts can be delivered via recordings through phones or computers.

The disadvantage of direct tests (like TOEFA) is their practicality, because it is time-consuming, since it has to be delivered individually to each candidate, in a face-to-face way, while semi-direct examinations can be delivered to groups and even using the internet, although it is not recommended for these kind of high stakes tests.

<u>Discrete - vs. - Integrative Assessment</u>

Since it is a test aimed to judge the communicative abilities of candidates, we are talking about an Integrative Assessment, which uses integrative or global items, like speaking about the last

changes in the work scenario, describe an aviation picture, re-tell an aviation audio, etc.

In this case, the test-takers have to demonstrate their ability to use the language in appropriate real or simulated situations that reflect real scenarios, where they have to put their knowledge in use.

Objective - vs. - Subjective Assessment

This test is subjectively assessed, because the assessors judge the performance of candidates according to their experience and criteria, and also considering the training received in the Initial ICAO Language Proficiency Raters Course and the   recurrent versions that they study every year. The ratings are done following the linguistic descriptors of the ICAO Rating Scale.

To diminish this subjectivity, the test is scored by two assessors (when applied for licensing purposes), in order to have a better inter-rater consistency and reliability, as well as the intra-rater reliability that is assured because the two assessors have to comply with a very strict profile of competencies, as to be able to perform these very important functions; so, even when the test is scored at different times or with different raters, the overall results should be the same.

Receptive – vs. – Productive skills

This test judges only the abilities of speaking (productive) and listening (receptive). However, since it is a direct face-to-face test, the listening ability is not scored through objective marking, but by judging the listening comprehension of the candidates through activities where they have to state orally what they have understood.

In the case of the productive skill of speaking, it is also measured through interactive activities. The entire interview is always recorded, allowing interlocutors/raters to listen to the language production of the candidates, as much as they need to listen to

them, in order to be sure of the levels that the candidates have demonstrated in all the six linguistic descriptors or language skills.

The recordings are also used for blind ratings of expert assessors, in the case of appeals of the test-taker or with the purpose to review and standardize the performance of raters.

Backward – vs. – Forward looking assessment

The test has a good *wash back* effect, since it gives information about what the candidates need to study in order to optimize their language competencies, because the syllabus is also based on practice with real scenarios, instead of measuring the theoretical knowledge of the language.

The test is aimed to have a very strong *wash forward* effect, since it is possible to forecast future performance of candidates, according to the results obtained in the test, since the test tasks and items are related to real language use in a work-related context. Afterwards, the real performance is monitored on the job and compared with the test results as to verify their consistency.

Contextualized – vs. – Disembodied language

Since the test items simulate real world language tasks, it is a contextualized test. All the interactions between the assessors and the candidates are related to a clearly defined communicative purpose, where the roles and channels are also clearly established, so according to their performance, candidates will be assigned a pass or fail score, depending on the language proficiency level that they demonstrate, according to the ICAO language proficiency rating scale, where the minimum satisfactory level is the Operational Level 4.

Criterion referenced – vs. – Norm-referenced assessment

This is a criterion-referenced test, because it judges the language proficiency of test takers according to the way they perform some specific integrative language tasks during the interview and comparing this performance with what is established in the ICAO language proficiency rating scale, and its linguistic and holistic descriptors.

It is good to mention at this point, that the test is not very practical in its design, because it requires the physical presence of the assessors and the candidates, thus involving high traveling costs when the test has to be applied in different parts of the world.

So, there are some tests that have been developed to be applied on the internet or by phone, which, from the commercial point of view, is a good business for those companies that have developed these testing alternatives.

Reliability - vs. – Validity

The test has shown to have good reliability, since there has been consistency in scoring between different raters, as well as when it has been scored by the same rater on different opportunities.

As a language proficiency test, the results have also been compared with the expectations of the teachers of the course (according to class performance of candidates) with the real results obtained in the test. The ratio of consistency was very high when analyzing this variable. These conclusions were obtained through informal interviews with the teachers responsible of the training of candidates.

The test has also demonstrated good reliability to predict future performance of candidates. In this case, it has been possible to monitor the performance of test-takers in the real job and the consistency has also been very high in this very important aspect.

These conclusions were obtained through informal follow-up of performance of air traffic controllers in Peru, as the author works for the Peruvian Air Navigation Services Provider since 1983.

One of the main reasons for this high reliability, even when it is a subjectively scored test, is the fact that the raters have received all the necessary training and they also comply with the raters qualifications and experience required by the International Civil Aviation Organization (ICAO).

The appropriate use of the band scales of the ICAO rating scale has also been one of the reasons why the reliability of the test has been good.

It is important to remember that this test judges language proficiency only in two language abilities (speaking and understanding), because that is the requirement of ICAO and not for test reliability considerations regarding assessment of productive skills.

In regards to validity, the test also has high validity because it measures what it is supposed to measure. As it has been previously mentioned, the test has been designed following the recommendations of the ICAO Document 9835 and the holistic and linguistic descriptors in a very strict way.

The test shows good face validity because the items reflect the areas that the test should judge, related to aviation and work-related matters.

Talking about construct validity, the test design is based on current theories of language testing.

As it has been mentioned before, the test allows the forecast of future real performance (wash forward effect), which is a characteristic consistent with the predictive validity of it.

I have had the opportunity to participate in the trials and use of an international test that is delivered by phone and also another international test that is delivered through the Internet.

I mention this because it has given me the opportunity to verify the concurrent validity of the TOEFA test, since the results obtained

are similar to the ones obtained with these two other tests that I have had the opportunity to interact with.

Regarding the characteristics of the test, it has a low utility (when applied for licensing purposes), from the point of view of the feedback that the students receive after it, even when the results give them a good idea of their actual language proficiency. However, this situation is different when we are talking about diagnostic examinations.

The only way to change this situation is allowing assessors the possibility to give additional feedback to students, although it is difficult because normally the test is not applied by the same institution that was in charge of the training, with the purpose to avoid possible loss of objectivity.

The test is good to discriminate between strong and weak students, what is an important characteristic too, considering the fact that depending on the results, there are very high stakes that will affect the life of the test-taker.

Regarding practicality, the test is not practical to assess big populations, because it is necessary to have time to do it and there is also the fact that assessors cannot examine too many candidates per day, so it would be necessary to have several teams of assessors, which is not so easy, due to the very specialized field that we are working with.

Photo 2. – Sample of picture used during TOEFA examinations.

CHAPTER III: Methodology of the Investigation

3.1. Informants

The informants were 331 Air Traffic Controllers that are actually working for the Air Navigation Services Providers (ANSP) of Nicaragua, Panama, Peru, and Bolivia. These people participated as test-takers of the above mentioned TOEFA examinations and the author participated as Rater of all these exams, that were performed during the years 2005 (Nicaragua and Panama), 2006 (Peru), and 2007 (Bolivia).

The informants are between 25 to 55 years old and most of them are men (85%) because women were not allowed to this profession until 15 years ago and because the interest to become an Air Traffic Controller is still lower in women than in men.

All the informants finished high school, since it is a requisite to enter the studies to become an Air Traffic Controller, which are delivered at the Civil Aviation Training Centers (CATC) of each Air Navigation Service Provider.

In all the cases, the native language background is Spanish and the proficiency level of the English language was unknown, even when they study and use technical English (aeronautical phraseology) for aeronautical radio-communications.

This was precisely one of the purposes of these diagnostic examinations, to know the English language proficiency of this population in plain language (in an aviation context), in the abilities of speaking and understanding, according to the linguistic descriptors of the ICAO Rating Scale.

The nationalities of the informants were Nicaraguans, Panamanians, Peruvians, and Bolivians and the idea of this thesis is to share the results of these examinations with some other professionals that could be interested in the field of English for Aviation.

Talking about the socio-economic status of the informants, most of them belong to the middle social class in their countries and their salaries are above the national average, although they are not so high if compared with salaries received by Air Traffic Controllers in USA, Canada, and the European Union.

There were no specific criteria for the selection of the subjects, because all of them were examined due to the fact that they work in the Air Traffic Control Services of their countries.

It is for this reason that this sample is very representative of the total population of ATCOs in Latin-America, since all the countries comply with the same demographic characteristics and these services are provided under the same umbrella and procedures of the International Civil Aviation Organization (ICAO) and that is why the results of this study can be generalized and applied to all the other countries in this Region.

3.2. Materials

As it has been mentioned before, the main tool used in the study was the examination TOEFA, which follows the structure shown in *Appendix 3: Tasks and Test Items Format*, at the end of this document. The main characteristics of the examination TOEFA have also been explained in the Introduction of this thesis.

For the first part of the interview, the open questions, the rater uses the script of the above mentioned format and keeps the conversation as natural as possible.

For the second task, the rater uses some previously selected aviation photos that are shown to the test-taker, who has to describe it or answer questions about it.

For the listening part, it is necessary to use good quality equipment for reproduction of the audio files. At the beginning I used to use radio equipments that reproduced the audio tapes. Another alternative was the use of some CD-ROMs with the audio files previously recorded on them, producing a much better sound than the tapes, which always produced a background noise.

And the last version has been the use of laptops, because most of the audio files are obtained from certain internet sites that are specialized in aviation issues and the sound quality is much better than the other alternatives; especially when external speakers are also used to improve and manage the sound of the recording. However, it will depend on the availability of these materials, although all of them are workable for this purpose.

Following the recommendations of ICAO Document 9835, all these interviews should be recorded and appropriately stored, with the purpose of analyzing them in the case that an additional scoring is necessary and also as feedback for training and for verification of the improvement of the test taker's language competencies.

For this purpose, I recommend the use of a digital voice recorder Olympus model WS-210S because it can record up to 138 hours continuously; although I normally use it in the function of high quality (HQ) that allows up to 35 hours of continuous recording and we normally need 6 to 7 hours daily for the 10 to 12 interviews that are scheduled each day.

However, the main reason to use this device is because the recordings are done in MP3 format, so they can be immediately

used on any computer or MP3 player device and that is something very useful.

Another important material that is used by the Raters when performing the interviews is the scoring sheet that they use to write down the levels demonstrated by the test-taker in the six skills of the ICAO rating scale, which they always have as a reference when writing the scores.

It is also used as a draft paper, where the assessor can write the scorings and change them according to the production of the test-taker, but it is also the official document (with the final results) that is presented to the Air Navigation Service Provider and a copy of it is given to the test-takers as feedback of their actual language proficiency. This tool is presented in *Appendix 4: TOEFA Scoring Sheet*.

The results are presented individually, using the scoring sheets and also in a general way, using Excel charts showing the general performance of the population in each place where the examinations are applied. It is also a good idea to present some graphics about this performance, as to have a general idea of the results.

It is very important that all examinations should be performed in a place specially arranged as to be free of any noise and interruptions that could disturb the normal development of the interview.

3.3. Procedures

The first task of the subjects of the study is to read the ICAO Document 9835 in advance, since it is a new international standard, most of them are not aware of the details of this regulation and there are some informal myths about the real ICAO language proficiency requirements and that is why it is very important to be familiar with the explanations and guidelines presented in this document.

That is why they received the electronic version of this ICAO document in advance, jointly with some general guidelines about the procedures of the test and the general characteristics of the TOEFA examinations. A copy of this communication is presented in *Appendix 5: TOEFA Procedures*.

The main task of the subjects was to be tested by the ICAO Expert (Rater) and try to have the best possible performance, according to their language proficiency.

All the materials were prepared in advance and the examinations were applied on a basis of 10 to 12 test-takers per day, since it is a very tiring job when working only with one rater (which was possible due to the fact that these were diagnostic examinations, because when they are licensing tests, it is compulsory to apply them with at least two raters (according to ICAO rules).

Then, the materials were administered according to the guidelines mentioned in the TOEFA Raters Manual and scoring the performance of the test-takers as established in the ICAO rating scale, by means of the TOEFA scoring sheet.

Before starting the tests in Nicaragua, the TOEFA examination was officially presented at the First International Aviation Language Symposium (IALS) that was held in Montreal, Canada, in September 2004. On this occasion, I was invited as a Speaker to this important international training event.

After that experience, some piloting processes were performed with Peruvian ATCOs, in order to evaluate the pros and cons of the test design. The main change to the original version was the elimination of the written exam of Aeronautical English Phraseology, since it was a very tedious activity, that required to have all test-takers together at the same time and it was very difficult to accomplish in some cases, mainly because they work by shifts.

So, the last version of the TOEFA examination does not have this task and it is also because the theoretical and practical knowledge of the aeronautical English phraseology is part of the examinations that the subjects have to accomplish before the Civil Aviation Authority of their countries, when they obtain or renew their aeronautical licenses.

There were no particular details or circumstances which could condition or affect the findings. I have to give testimony that in all the cases the examinations were applied in a very professional way, by all the people that participated in them (rater, test-takers, ANSP authorities, support personnel, etc.). So, the findings obtained are very reliable.

The process of the examination lasts approximately 30 minutes for each test-taker. The levels that take more time are levels Pre-Operational 3 and Operational 4 and sometimes I had to spend five or ten minutes more with these test-takers, as to be completely sure of their real language proficiency.

Both extremes of the scale are easier to identify, because the Pre-Elementary Level 1 is a person that only speaks his/her first language and the Expert Level 6 is a person with a very good command of the English language, which is also very easy to recognize.

3.4. Analysis

The data of this study is quantitative, so the analysis will also be quantitative, mainly using percentages about the general results obtained in the places where the TOEFA examinations were applied, presented in this study as Practical Cases, where we will also show some graphics about these results.

However, there will also be some qualitative conclusions and reflections that we can mention after analyzing the data and as result of the real professional experience of the rater when applying these examinations.

In this point, I agree with Allwright and Bailey (1991:67) when saying that: "It should be clear that we see most value in investigations that combine objective and subjective elements, that quantify only what can be usefully quantified, and that utilize qualitative data collection and analysis procedures wherever they are appropriate."

So, I will present the descriptive summary of the results obtained in each of the four countries where the examinations were applied, presenting the general graphics about them and also showing the charts with the tests results.

3.4.1. Practical Case 1: TOEFA Examinations in Nicaragua – March 2005

FINAL RESULTS - NICARAGUA
MARCH 2005

TOEFA - TEST OF ENGLISH FOR AVIATION ®

No.	PRONUNCIATION	STRUCTURE	VOCABULARY	FLUENCY	COMPREHENSION	INTERACTIONS	LEVEL
01	6	6	6	6	6	6	6
02	6	6	6	6	6	6	6
03	6	5	5	5	5	5	5
04	5	5	5	5	5	5	5
05	5	5	5	5	5	5	5
06	4	4	4	4	4	4	4
07	4	4	4	4	5	4	4
08	4	4	4	5	5	4	4
09	4	4	4	4	4	4	4
10	4	4	4	4	4	4	4
11	4	4	4	4	5	4	4
12	5	5	5	4	6	4	4
13	4	4	4	5	4	4	4
14	4	4	4	4	4	4	4
15	3	3	4	4	4	4	3
16	4	4	4	3	3	4	3
17	3	5	5	4	4	4	3
18	3	3	4	4	4	4	3
19	3	4	4	5	5	4	3
20	4	3	3	4	3	3	3
21	3	2	4	3	5	4	2
22	3	3	3	2	2	3	2
23	3	2	2	2	3	2	2
24	2	2	2	3	4	2	2
25	3	2	3	4	2	3	2
26	3	3	3	3	2	2	2
27	2	2	2	3	3	2	2
28	2	2	3	2	2	2	2
29	3	2	2	2	2	2	2
30	3	3	3	4	2	3	2
31	3	2	3	4	2	3	2
32	1	1	1	1	1	1	1
33	3	2	2	3	1	3	1
34	1	2	1	1	2	1	1
35	1	1	1	1	1	1	1

LEVEL = ENGLISH LANGUAGE PROFICIENCY LEVEL ACCORDING TO ICAO RATING SCALE (MINIMUM SATISFACTORY: OPERATIONAL LEVEL 4)

(*) APPROVED CONTROLLERS WITH GREEN BACKGROUND

Chart 1: TOEFA Final Results in Nicaragua

FINAL RESULTS ACCORDING TO MINIMUM REQUIRED COMPETENCIES

40%

60%

☐ 4 or above   ■ Less than 4
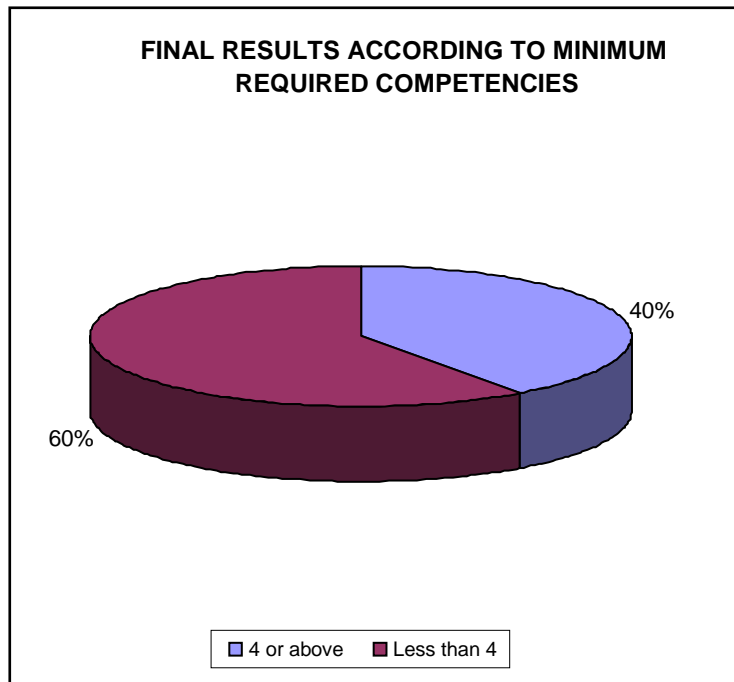
Figure 2: TOEFA Final Results in Nicaragua

FINAL RESULTS BY LEVELS
Nicaragua - 2005

6%

9%

11%

26%

17%

31%

☐ 1
■ 2
☐ 3
☐ 4
■ 5
☐ 6
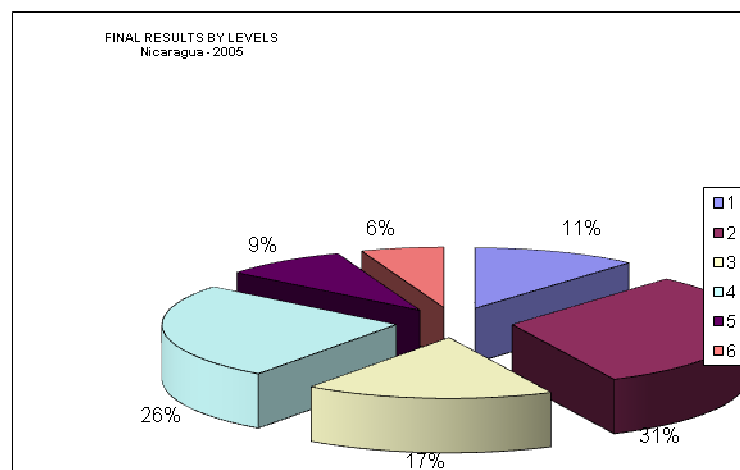
Figure 3: TOEFA Results by Level – Nicaragua 2005

These examinations were performed in the city of Managua, which is the capital of Nicaragua. 35 Air Traffic Controllers were interviewed according to the TOEFA procedures.

14 Controllers (40%) obtained results at Level 4 or above, while 21 of them (60%) obtained results bellow Level 4, as shown in **Figure 2**.

Regarding the results disaggregated by levels, 4 candidates (11%) demonstrated competencies at Level 1; 11 candidates (31%) were scored at Level 2; 6 Controllers (17%) were at Level 3; 9 persons (26%) demonstrated proficiency at Level 4; 3 persons (9%) were at Level 5 and only 2 persons demonstrated the Expert Level 6.

These disaggregated results are shown in **Figure 3** in the previous page and the Excel chart with all the individual results are presented in **Chart 1: TOEFA Final Results in Nicaragua**.

Although it can be seen that pronunciation is one of the weakest areas among the candidates that failed to obtain the minimum satisfactory Level 4 (as in the case of Informants 15, 17, 18 and 19), this trend is not so high as to infer that this is the only or main linguistic problem for this population.

On the contrary, we can see that these candidates consistently fail in the other language skills too.

3.4.2. Practical Case 2: TOEFA Examinations in Panama – September 2005

FINAL RESULTS - PANAMA 2005 *(Part 1)*
SEPTEMBER 2005

TOEFA - TEST OF ENGLISH FOR AVIATION ®

No.	PRONUNCIATION	STRUCTURE	VOCABULARY	FLUENCY	COMPREHENSION	INTERACTIONS	LEVEL
01	6	6	6	6	6	6	6
02	6	6	6	6	6	6	6
03	6	6	6	6	6	6	6
04	6	6	6	6	6	6	6
05	6	6	6	6	6	6	6
06	6	6	6	6	6	6	6
07	6	6	6	6	6	6	6
08	6	6	6	6	6	6	6
09	6	6	6	6	6	6	6
10	6	6	6	6	6	6	6
11	6	6	6	6	6	6	6
12	6	6	6	6	6	6	6
13	6	6	6	6	6	6	6
14	6	6	6	6	6	6	6
15	6	6	6	6	6	6	6
16	6	6	6	6	6	6	6
17	6	6	6	6	6	6	6
18	6	6	6	6	6	6	6
19	6	6	6	6	6	6	6
20	6	6	6	6	6	6	6
21	6	6	6	6	6	6	6
22	6	6	6	6	6	6	6
23	6	6	6	6	6	6	6
24	6	6	6	6	6	6	6
25	6	6	6	6	6	6	6
26	6	6	6	6	6	6	6
27	6	6	6	6	6	6	6
28	5	6	6	5	6	5	5
29	5	5	5	5	5	5	5
30	6	5	6	6	6	6	5
31	5	5	5	5	5	5	5
32	5	5	5	5	5	5	5
33	5	5	5	5	6	5	5
34	5	5	5	5	5	5	5
35	5	6	6	5	6	5	5
36	5	5	5	5	5	5	5
37	5	5	6	5	6	5	5
38	6	6	5	5	5	5	5
39	6	5	6	5	6	5	5
40	5	5	5	6	6	5	5
41	5	5	6	5	6	5	5
42	5	5	5	5	5	5	5
43	5	4	4	4	6	5	4
44	4	4	4	4	5	4	4
45	4	4	4	4	5	4	4
46	4	5	5	4	5	5	4
47	5	5	4	5	5	4	4
48	4	4	4	4	4	5	4
49	5	4	4	4	4	4	4
50	4	4	4	4	4	4	4

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TOEFA - TEST OF ENGLISH FOR AVIATION ®

51	5	4	5	5	4	5	4
52	4	4	4	4	4	4	4
53	4	4	4	4	5	4	4
54	4	4	4	4	5	4	4
55	4	4	4	4	5	4	4
56	5	4	4	5	5	4	4
57	4	4	4	4	4	4	4
58	4	4	4	4	4	4	4
59	4	4	4	4	4	4	4
60	5	4	5	5	5	4	4
61	5	4	5	4	5	4	4
62	5	5	5	5	4	5	4
63	5	4	5	5	5	4	4
64	5	4	4	4	5	4	4
65	4	4	4	4	5	5	4
66	5	4	4	5	4	5	4
67	4	4	4	4	4	4	4
68	4	4	4	5	5	4	4
69	5	5	4	4	5	4	4
70	5	4	5	5	3	4	3
71	4	3	3	3	4	4	3
72	4	4	3	3	3	3	3
73	2	2	2	3	3	3	2
74	3	3	3	4	2	3	2
75	3	3	2	3	2	2	2
76	3	3	2	3	2	2	2
77	3	2	2	2	2	2	2
78	3	2	3	2	4	2	2
79	3	2	2	3	4	2	2
80	3	2	2	3	2	3	2
81	2	2	2	2	2	2	2
82	1	1	1	1	1	1	1
83	2	1	1	2	2	2	1
84	2	2	1	1	1	2	1
85	1	1	1	1	1	1	1
86	1	1	1	1	1	1	1
87	2	2	2	2	1	2	1
88	1	1	1	1	2	1	1
89	2	1	1	2	2	2	1
90	1	1	1	1	1	1	1
91	1	1	1	1	1	1	1
92	2	1	1	2	2	2	1
93	1	1	1	1	1	1	1
94	2	1	1	1	1	2	1

LEVEL = ENGLISH LANGUAGE PROFICIENCY LEVEL ACCORDING TO ICAO RATING SCALE (MINIMUM SATISFACTORY: OPERATIONAL LEVEL 4)

(*) APPROVED CONTROLLERS WITH GREEN BACKGROUND

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Chart 2: TOEFA Final Results in Panama

FINAL RESULTS ACCORDING TO MINIMUM REQUIRED COMPETENCIES

27%

73%

4 or above   Less than 4
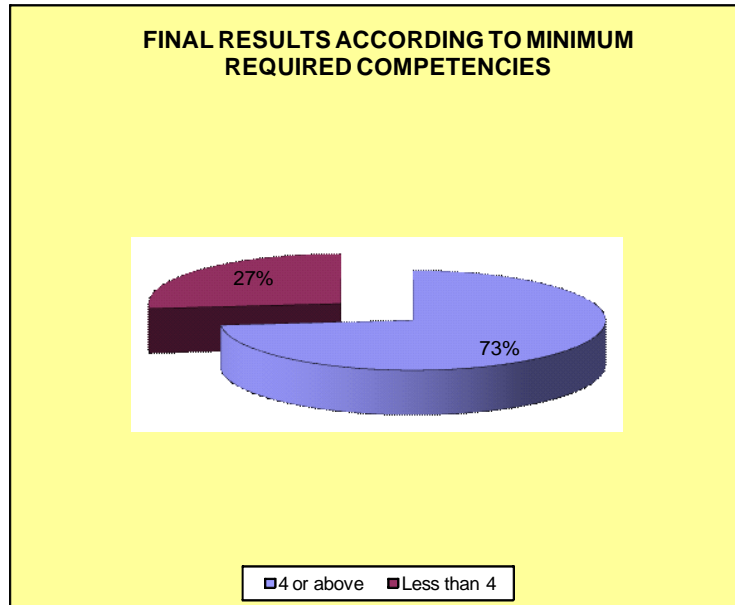
Figure 4: TOEFA Final Results in Panama

RESULTS BY LEVELS

29%   14%   9%

16%   29%   3%

1
2
3
4
5
6
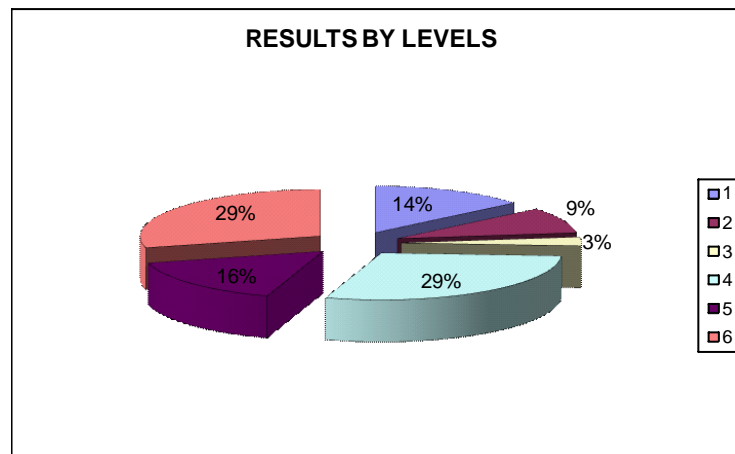
Figure 5: TOEFA Results by Level – Panama 2005

These examinations were performed in Panama City, which is the capital of Panama. 94 Air Traffic Controllers were interviewed according to the TOEFA procedures.

69 Controllers (73%) obtained results at Level 4 or above, while 25 of them (27%) obtained results bellow Level 4, as shown in **Figure 4**.

Regarding the results disaggregated by levels, 13 candidates (14%) demonstrated competencies at Level 1; 9 candidates (9%) were scored at Level 2; 3 Controllers (3%) were at Level 3; 27 persons (29%) demonstrated proficiency at Level 4; 15 persons (16%) were at Level 5 and 27 persons (29%) demonstrated the Expert Level 6.

These disaggregated results are shown in **Figure 5** and the Excel chart with all the individual results are presented as **Chart 2: TOEFA Final Results in Panama**.

In this case, informants 70, 71, and 72 failed in some other linguistic descriptors, rather than pronunciation when demonstrating Level 3.

Regarding the other informants that failed to reach the minimum satisfactory Level 4, we can see that they consistently fail in all the linguistic areas evaluated through this examination.

In this particular case, it is necessary to take into account that the Panamanians were exposed to the English language for several years, due to the fact that Americans were in charge of the administration of the Panama Channel for one hundred years.

3.4.3. Practical Case 3: TOEFA in Peru – 2006

FINAL RESULTS - PERU

ENERO - MARZO 2006

TOEFA - TEST OF ENGLISH FOR AVIATION *(Part 1)*

N°	PRONUNCIATION	STRUCTURE	VOCABULARY	FLUENCY	COMPREHENSION	INTERACTIONS	LEVEL
01	6	6	6	6	6	6	6
02	6	6	6	6	6	6	6
03	6	6	6	6	6	6	6
04	6	6	6	6	6	6	6
05	6	5	5	6	6	6	5
06	6	6	5	5	6	5	5
07	6	6	5	5	6	5	5
08	6	5	5	6	5	5	5
09	6	5	5	5	5	6	5
10	6	5	6	5	5	6	5
11	6	5	5	5	5	6	5
12	5	5	5	5	6	5	5
13	5	6	5	5	6	6	5
14	5	5	5	6	6	6	5
15	5	5	5	5	6	5	5
16	5	6	6	5	6	6	5
17	5	5	5	5	5	5	5
18	5	5	5	5	5	5	5
19	5	5	5	5	5	5	5
20	5	5	5	5	5	5	5
21	5	5	5	5	5	5	5
22	5	5	5	5	5	5	5
23	5	5	5	4	6	4	4
24	5	5	5	4	6	4	4
25	5	5	4	4	5	4	4
26	5	5	5	4	5	4	4
27	5	4	4	5	5	5	4
28	5	5	5	4	5	4	4
29	5	5	5	4	5	4	4
30	5	4	4	5	5	5	4
31	5	5	5	5	4	5	4
32	5	4	5	4	4	4	4
33	5	4	5	5	4	5	4
34	5	4	5	5	4	5	4
35	5	4	4	5	4	5	4
36	4	5	5	4	6	4	4
37	4	4	5	4	5	5	4
38	4	5	5	4	5	5	4
39	4	4	4	4	5	4	4
40	4	4	4	4	5	4	4
41	4	4	4	4	5	4	4
42	4	4	4	4	5	4	4
43	4	4	4	4	5	4	4
44	4	4	4	4	5	4	4
45	4	5	5	5	5	5	4
46	4	4	4	4	5	4	4
47	4	4	4	4	5	4	4
48	4	4	4	4	5	4	4
49	4	4	4	4	5	4	4
50	4	4	4	4	5	4	4
51	4	4	4	4	5	4	4
52	4	4	4	4	5	4	4
53	4	4	4	4	5	4	4
54	4	4	4	4	5	4	4
55	4	4	4	4	4	4	4
56	4	4	4	4	4	4	4
57	4	4	4	4	4	4	4
58	4	5	4	5	4	5	4
59	4	5	5	4	4	4	4
60	4	4	4	4	4	4	4

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TOEFA - TEST OF ENGLISH FOR AVIATION *(Part 2)*

61	4	4	4	4	4	4	4
62	4	4	4	4	4	4	4
63	4	4	4	4	4	4	4
64	5	5	3	3	5	4	3
65	5	4	3	3	5	4	3
66	4	3	4	4	5	3	3
67	4	4	4	3	5	3	3
68	4	4	3	3	5	4	3
69	4	4	3	3	5	4	3
70	4	3	3	4	4	4	3
71	4	4	3	3	4	3	3
72	4	3	4	4	3	3	3
73	4	4	4	4	3	4	3
74	4	5	4	4	3	4	3
75	4	4	3	3	3	3	3
76	3	3	4	3	4	3	3
77	3	4	4	3	4	3	3
78	3	3	4	3	3	3	3
79	3	4	3	3	3	3	3
80	3	4	3	3	3	4	3
81	4	2	3	3	3	3	2
82	4	4	4	4	2	4	2
83	4	3	4	4	2	3	2
84	4	3	3	3	2	4	2
85	3	2	2	3	5	3	2
86	3	3	2	2	4	2	2
87	3	3	3	2	3	3	2
88	3	2	2	3	3	2	2
89	3	2	2	2	3	2	2
90	3	3	2	2	2	3	2
91	3	3	3	3	2	4	2
92	3	2	3	3	2	3	2
93	3	3	4	4	2	4	2
94	3	3	4	4	2	4	2
95	2	2	2	3	4	3	2
96	2	3	3	3	2	3	2
97	2	3	3	2	2	2	2
98	2	2	2	2	2	2	2
99	3	2	2	3	1	2	1
100	2	2	1	1	1	1	1
101	2	2	2	2	1	2	1
102	2	2	3	2	1	2	1
103	2	2	1	1	1	2	1
104	2	2	2	2	1	3	1
105	1	2	1	1	2	2	1
106	1	1	2	2	2	2	1
107	1	2	1	2	1	2	1
108	1	1	2	2	1	1	1
109	1	1	2	2	1	2	1
110	1	1	2	2	1	2	1
111	1	1	1	1	1	2	1
112	1	1	2	1	1	1	1
113	1	1	1	1	1	1	1

LEVEL = ENGLISH LANGUAGE PROFICIENCY LEVEL ACCORDING TO ICAO RATING SCALE (MINIMUM SATISFACTORY: OPERATIONAL LEVEL 4)

(*) APPROVED CONTROLLERS WITH GREEN BACKGROUND

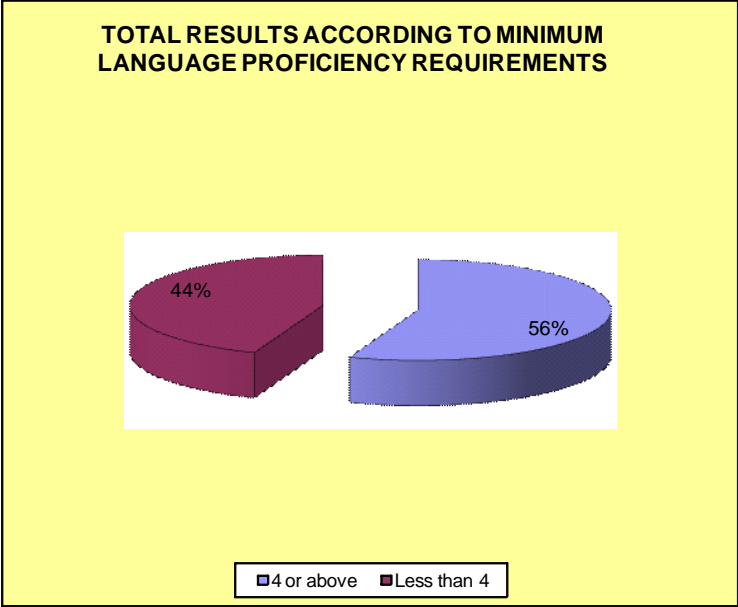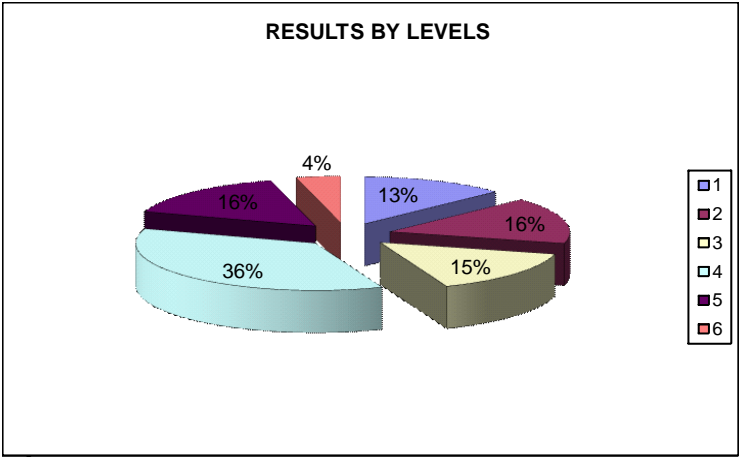**Chart 3 : TOEFA Final Results in Peru**

Figure 6: TOEFA Final Results in Peru

Figure 7: TOEFA Results by Level – Peru 2006

These examinations were performed in Lima, which is the capital of Peru, and where the main Peruvian Air Traffic

Control Center is located. 113 Air Traffic Controllers were interviewed according to the TOEFA procedures.

63 Controllers (56%) obtained results at Level 4 or above, while 50 of them (44%) obtained results bellow Level 4, as shown in **Figure 6**.

The disaggregated results, by levels, shown that 15 candidates (13%) demonstrated competencies at Level 1; 18 candidates (16%) were scored at Level 2; 17 Controllers (15%) were at Level 3; 41 persons (36%) demonstrated proficiency at Level 4; 18 persons (16%) were at Level 5 and only 4 persons (4%) demonstrated the Expert Level 6.

These disaggregated results are shown in **Figure 7** and the Excel chart with all the individual results are presented in **Chart 3: TOEFA Final Results in Peru**.

In this case, informants 64 to 75 failed in some other linguistic descriptors, rather than pronunciation when demonstrating Level 3. The same happens with Informants 81 to 84, as a confirmation that pronunciation is not the main problem of candidates that have not reached the minimum satisfactory level yet.

Regarding the other informants that failed to reach the minimum satisfactory Level 4, we can see that they consistently fail in all the linguistic areas evaluated through this examination.

3.4.4. Practical Case 4: TOEFA Examinations in Bolivia – May 2007

FINAL RESULTS - BOLIVIA
MAY 2007

TOEFA - TEST OF ENGLISH FOR AVIATION *(Part 1)*

No.	PRONUNCIATION	STRUCTURE	VOCABULARY	FLUENCY	COMPREHENSION	INTERACTIONS	LEVEL
01	6	6	6	6	6	6	6
02	6	6	6	6	6	6	6
03	6	6	6	6	6	6	6
04	6	6	6	6	6	6	6
05	6	6	6	6	6	6	6
06	6	6	6	6	6	6	6
07	6	6	6	6	6	6	6
08	5	5	6	5	6	6	5
09	6	6	6	5	6	5	5
10	5	6	6	5	6	6	5
11	5	5	6	6	6	5	5
12	5	6	6	6	5	5	5
13	4	4	4	4	5	4	4
14	4	4	4	4	4	4	4
15	4	4	5	5	4	4	4
16	4	5	5	5	4	5	4
17	4	4	4	4	4	4	4
18	4	4	4	5	5	5	4
19	5	5	5	4	5	4	4
20	4	4	4	4	4	4	4
21	4	4	4	4	4	4	4
22	4	4	4	4	4	4	4
23	5	5	5	4	5	5	4
24	4	4	5	4	5	4	4
25	4	5	5	5	4	5	4
26	3	4	4	3	4	3	3
27	3	4	4	3	3	4	3
28	3	3	4	3	4	4	3
29	3	4	4	3	4	4	3
30	3	3	3	3	4	3	3
31	3	3	3	4	3	4	3
32	4	3	4	3	4	3	3
33	4	4	4	3	3	3	3
34	3	4	4	3	4	4	3
35	3	4	4	3	3	4	3
36	3	3	4	3	4	4	3
37	4	3	4	3	4	3	3
38	3	4	4	3	4	4	3
39	3	3	4	3	4	4	3
40	3	3	3	3	3	3	3
41	2	3	3	2	3	3	2
42	2	3	3	2	2	3	2
43	3	3	2	2	3	3	2
44	2	2	3	2	2	3	2
45	3	2	3	2	2	2	2
46	3	2	3	2	2	2	2
47	2	2	3	3	2	3	2
48	2	2	3	3	2	4	2
49	3	3	3	3	2	2	2
50	2	2	2	2	2	2	2

53

TOEFA - TEST OF ENGLISH FOR AVIATION *(Part 2)*

51	2	3	3	2	2	3	**2**
52	3	3	3	2	2	2	**2**
53	2	2	3	2	2	3	**2**
54	1	1	2	2	1	2	**1**
55	1	1	2	2	1	2	**1**
56	1	1	2	2	3	2	**1**
57	1	1	1	1	1	1	**1**
58	1	1	1	1	1	1	**1**
59	1	1	2	1	1	1	**1**
60	1	2	2	2	1	3	**1**
61	1	1	1	1	1	1	**1**
62	2	1	2	2	1	2	**1**
63	1	1	2	1	2	1	**1**
64	1	2	2	1	2	2	**1**
65	2	1	2	2	1	2	**1**
66	1	1	1	1	1	1	**1**
67	1	1	2	1	1	1	**1**
68	1	1	1	1	1	1	**1**
69	1	2	1	2	3	3	**1**
70	1	1	1	1	1	2	**1**
71	1	1	1	1	1	1	**1**
72	1	1	1	1	1	1	**1**
73	1	1	1	1	1	1	**1**
74	1	1	1	1	1	1	**1**
75	1	1	1	1	1	1	**1**
76	1	1	1	1	1	1	**1**
77	1	1	1	1	1	1	**1**
78	1	1	1	1	1	1	**1**
79	1	1	1	1	1	1	**1**
80	1	1	1	1	1	1	**1**
81	1	1	2	1	2	2	**1**
82	1	1	1	1	1	1	**1**
83	1	1	1	1	1	1	**1**
84	1	1	1	1	1	1	**1**
85	1	1	1	1	1	1	**1**
86	1	1	1	1	1	1	**1**
87	1	1	1	1	1	1	**1**
88	1	1	1	1	1	1	**1**
89	1	1	1	1	1	1	**1**

LEVEL = ENGLISH LANGUAGE PROFICIENCY LEVEL ACCORDING TO ICAO RATING SCALE (MINIMUM SATISFACTORY: OPERATIONAL LEVEL 4)

(*) APPROVED CONTROLLERS WITH GREEN BACKGROUND

Chart 4: TOEFA Final Results in Bolivia

Figure 8: TOEFA Final Results in Bolivia

Figure 9: TOEFA Results by Level – Bolivia 2007
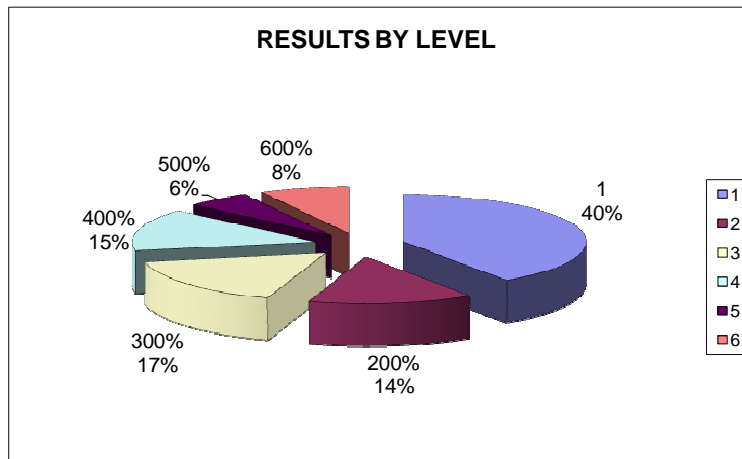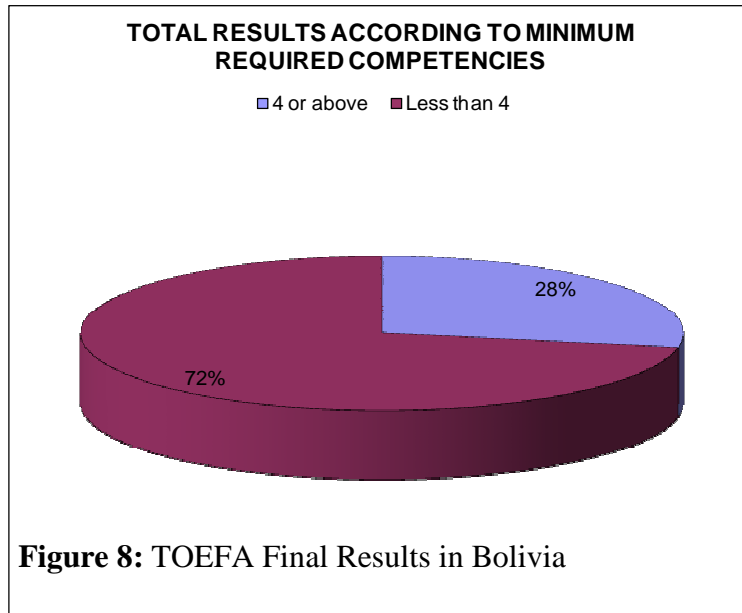
These examinations were performed in La Paz, which is the capital of Bolivia and where the main Bolivian Air Traffic Control Center (ACC) is located. 89 Air Traffic Controllers were interviewed according to the TOEFA procedures.

25 Controllers (28%) obtained results at Level 4 or above, while 64 of them (72%) obtained results bellow Level 4, as shown in **Figure 8**.

Regarding the results disaggregated by levels, 36 candidates (40%) demonstrated competencies at Level 1; 13 candidates (15%) were scored at Level 2; 15 Controllers (17%) were at Level 3; 13 persons (15%) demonstrated proficiency at Level 4; 5 persons (6%) were at Level 5 and 7 persons (8%) demonstrated the Expert Level 6.

These disaggregated results are shown in **Figure 9** and the Excel chart with all the individual results are presented in **Chart 4: TOEFA Final Results in Bolivia**.

In this case, Informants 26 to 29 have problems with pronunciation when demonstrating Level 3, although this situation changes with Informants 32, 33, and 37 which failed in some other linguistic descriptors, rather than pronunciation when demonstrating Level 3.

As in the other Practical Cases, the other Informants that failed to reach the minimum satisfactory Level 4 consistently fail in all the linguistic areas evaluated through this examination.

CHAPTER IV: Discussion of Results

Arriving to this part of the thesis, it is possible to answer the questions that we raised at the beginning of this study:

a)   Is pronunciation the only problem that we have to address?

As it has been mentioned before in this study, there was a common prejudice among English for Aviation Experts that the main linguistic problem for Latin American air traffic controllers was pronunciation.

The main forums are the one administered by ICAEA (International Civil Aviation English Association) and Flight English, which is administered by a team of independent English for Aviation Consultants and Teachers, as well as aviation practitioners.

According to the results presented in this study, this belief is not true, because in most of the cases, the cause of failure for this population (to demonstrate English proficiency at the Operational Level 4) is not exclusively associated with pronunciation problems, but mainly due to a lack of proficiency in all the six linguistic descriptors of the ICAO rating scale.

I think that the cause of this belief is derived from the fact that Latin American controllers have a strong influence of their L1 when communicating in the English language. However, when we compare this language production with the linguistic descriptors established in the ICAO rating scale, we can see that it is not a real problem for aeronautical communications (that is a completely different scenario if compared with general English language conversations).

I have had the opportunity to verify this problem when working with raters that are new in the aviation field and that they are not familiarized with the ICAO language standard and the ICAO rating scale.

In most of the cases, their ratings were under the scoring of the Expert, because they had a higher expectation for the candidate's production, due to the fact that they were comparing this production with the general idea that the raters had about what is a "good" or "bad" production, in general English.

However, when they studied the Document 9835 and they became familiarized with the ICAO rating scale, their scorings were more appropriate and at the end, fair for the candidate.

b) Should we prepare a training program based mainly on pronunciation issues?

Negative. The results of the examinations performed in Nicaragua, Panama, Peru, and Bolivia give enough evidence that pronunciation is not the only problem of air traffic controllers that are in Levels 1, 2 and 3 of the ICAO rating scale.

So, organizations should consider this information when designing their training programs, because otherwise they could improve one of the language skills (pronunciation) but they could still have problems with the other language areas. Since a person should demonstrate at least Level 4 in all the six language skills, they could have the risk to fail again, even after studying with this badly designed training program.

c)   What is the level of language competencies in the other five skills examined?

As it has already been mentioned, the study shows a general consistency (with some exceptions) in the demonstration of language competencies of the Informants and this situation is applied for those that got satisfactory or unsatisfactory levels, so it is also a demonstration that it is wrong what is believed about having pronunciation as the only or main linguistic problem of this population.

d)   What is the "wash back" effect of the examination to design the appropriate training?

The TOEFA examination has demonstrated to have a good "wash back" characteristic. The first pilot training program was established in Nicaragua, taking as input the results of the diagnostic examinations applied in that country in 2005.

All the candidates were grouped according to their ICAO levels, so one team was formed by Controllers in levels 1 and 2, another classroom was formed with people in levels 3 and 4, and the last team called the "maintenance team" was formed by those in levels 5 and 6.

The academic objectives were to help those people with competencies below level 4 to reach this satisfactory level and then to join the "maintenance team" that also needed training in order to practice the foreign language and avoid losing proficiency.

After one year of intensive training, all the personnel were at least in level 4 and participating in a continuous training program to maintain their language abilities. So, when the ICAO deadline arrived, on March 2008, the Nicaraguan State was ready to accomplish with this international standard, without having to ask for an additional extension of time.

The same approach has been applied in all of the above mentioned countries, with the same excellent results and there have not been any cases where a candidate has been changed from one group to another due to a bad result in the diagnostic test.

So, the implications of this study are very important because it is the first time that enough and real evidence is shown about the language proficiency of the population of air traffic controllers from the Latin American region and that is why this information will be very useful for teachers and linguists that work or plan to work in the English for Aviation field.

But since the main objective of this ICAO standard is to improve the safety of the aeronautical operations, the conclusions of this study will also contribute to this objective, since testing and training alternatives will be applied in order to help all the Latin American air traffic controllers in their efforts to reach the minimum language proficiency requirements established by the International Civil Aviation Organization (ICAO).

It is necessary to have in mind that after March 2011 those people who do not demonstrate at least the Operational Level 4 will not receive their aeronautical licenses, which means that they will not be able to continue working in their aviation organizations, when operating in international scenarios.

This study presents innovations that will be useful for new developments in the linguistic studies of this professional area and they can be compared with the theoretical background presented in this document and this situation will enrich the academic value of this pilot study.

There have not been limitations in this study, mainly because the researcher had all the information regarding the results of the tests, what is not very common, considering the fact that there are several test providers and it is normal that States can choose different ones.

In conclusion, the results of this investigation are very important and represents the first study that shows academic conclusions based on a good sample of the target population.

It is precisely due to this factor that we can mentions that the results presented are very reliable and they demonstrate that the Informants have weaknesses in all the six abilities of the ICAO rating scale.

Considering these results they will need to participate in training courses which contents should be based in the optimization of these six abilities and not only based on pronunciation, as it was believed.
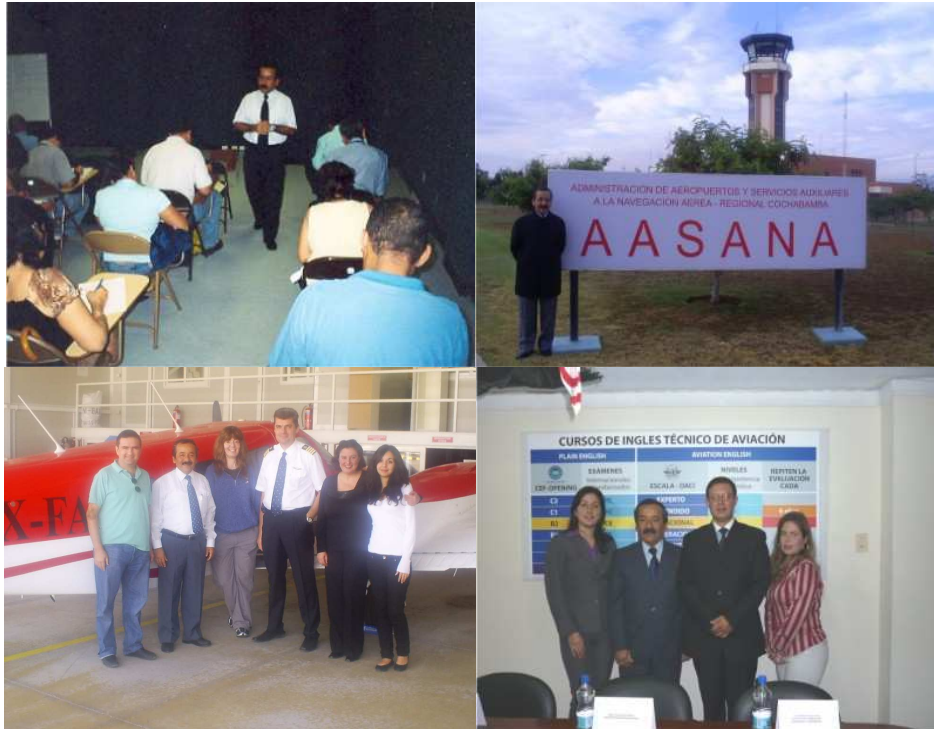

Photo 3. - TOEFA examinations were applied in Nicaragua (2005), Panama (2005), Peru (2006) and Bolivia (2007), with excellent results. Its use has also been approved in Greece (2008) and in Ecuador, since 2010.

Conclusions

The main conclusion of this study is the fact that Latin American Air Traffic Controllers have weaknesses in all the six linguistic descriptors of the ICAO rating scale, so the training approach (to convert these weaknesses into strengths) should consider communicative strategies that cover this need in an integral way and do not focus only on isolated skills, like pronunciation.

This verification demonstrates that it was a bad assumption to say that the main weakness of this population was only pronunciation and the implications of this confirmation are very important because there were some training approaches that were based mainly on pronunciation.

However, the problem is that even after studying those training programs, candidates still had problems with structure, vocabulary, fluency, comprehension or interactions, so they failed again in their examinations.

The results of this study are very important for language teaching professionals, as to know the real diagnosis about the language proficiency of this population, considering the fact that this is the first study of this type that is presented in an academic scenario. So, one of the purposes of this study is to share these findings with all my colleagues.

The main reason for not having information about the results of these diagnostic examinations is the fact that they are always kept secret, because they belong to the organizations that hire the consultant or the institution that applies the diagnostic tests. However, in this case, the author established that the results could be used for academic purposes and without revealing the identity of the Informants, as it has been accomplished in this study.

I think that it will also be useful for the development of local or international training initiatives to address the need for improvement of competencies of this population, in order to be proficient at Operational Level 4 in the abilities of speaking and understanding, in all the six linguistic descriptors.

It is also important to mention the importance of English for Aviation testing nowadays. At the beginning this standard was rejected by aeronautical personnel, because they saw it as a threat to their professional development.

However, after being implemented in several countries (like Peru), it has been proved that it is something that can be achieved by everybody if they are efficiently trained and prepared in advance.

Another important point is the ethical issue. I had the opportunity to work in a country were the examinations were performed only by one institution and they were also the only company accredited to deliver training, which is not advisable because there could be a conflict of interest when performing testing.

In this specific case, candidates were intentionally qualified below their real competence and obligated to pay for their training at this same institution; this was clearly a bad practice.

When the civil aviation authority of that country realized that this was a situation that could not continue, they decided to certify the TOEFA examination as the second alternative and it was clearly stated from the very beginning that the institution selected to administer the TOEFA

examination in that country was not authorized to deliver training and the results have been excellent until now.

Finally, I think that it is necessary to show results of good testing practices by giving evidence of real performance of candidates on their jobs, because there are several tests that claim to be valid and reliable just because they complied with all the procedures during the phase of test design.

However, I think that the main problem is still related to the tasks and test items selected to test the proficiency of pilots and ATCOs. Most of the tests that we have in this market nowadays use tasks and test items related mostly with basic and advanced aeronautical phraseology (unusual urgency and emergency situations).

But from my experience working as an Aeronautical Station Operator and as an Air Traffic Controller, I am convinced that it is also necessary to have a good command of the general English (in an aviation context) because it is the only way to be able to "negotiate for meaning" in any situation that could arise during aeronautical radio communications. This is what this ICAO standard calls "plain language" for aviation.

In general, the main contribution of this thesis is the fact that it shows results obtained directly from the field were air traffic controllers perform their duties, which is normally a difficult task to achieve, because this is a very restricted and specialized area.

Another contribution is related to the design of new training alternatives that can be delivered and administered in order to help to this population to achieve their language proficiency objectives, because it has been clearly established that the weaknesses in their command of the English language, applied in their aviation functions, are related to all the six skills of the ICAO rating scale.

The results of this investigation are also useful for Air Navigation Services Providers from other countries, because they could reply the model applied in the four countries analyzed, in order to introduce best

practices in the implementation of the ICAO language proficiency requirements, with the purpose to obtain the best possible results.

The academic implications of these conclusions are regional (Latin America) but the methodology applied can easily be applied in a global basis, because the job of an air traffic control is very similar around the world, although there will be different English language proficiency characteristics, according to local or regional variations around the world.

The professional perspectives in our country are good for language teachers, because aviation English is an area that is not too developed yet in our country, mainly due to a lack of information about the developments mentioned in this investigation.

And since it is a global issue, the necessity of English for Aviation teachers and raters is continuously increasing around the world, especially in big countries like China or Russia, due to its big population of pilots and air traffic controllers.

So, this is a good professional opportunity and that is why I think that this thesis will also contribute to disseminate the issues and characteristics of English for Aviation among the English teaching community in our country.

As a final thought, during the Initial ICAO Language Proficiency Raters Course that I had the opportunity to dictate in La Paz, Bolivia, in December 2010, I commented to my students the importance of the ethical component in the behavior of all the elements involved in the implementation of this ICAO standard (pilots, air traffic controllers, civil aviation authorities, airlines, air navigation service providers, teaching and testing providers, raters, as well as ICAO inspectors).

Since this is a very sensitive issue and the tests are considered as high stake examinations, due to the implications of their results (economical, safety and possibility of job loss), there will always be some pressures for bad practices but the only way to contribute with the desired results is to always act with integrity and according to the ethical codes of our professions.

Recommendations

From my very personal point of view and due to the very high stakes involved in this test, I firmly recommend the face-to-face alternative for tests, because I think that it is the best way to accomplish with all the holistic and linguistic descriptors established in this ICAO standard.

I also think that it is the best alternative for the candidates, because being a communicative test; it is a good and fair way for them to demonstrate their abilities and performance, despite external factors like nervousness.

Talking about automated tests, candidates do not have the possibility to interact with the interlocutors or raters, because there are very precise and restricted spaces of time for them to listen/answer to the test items, which does not resemble what really happens in real situations, where they have time to "negotiate for meaning."

Another important suggestion for professionals interested in further research about this field is that it is very important to have access to the real environment where pilots and air traffic controllers perform their duties, because otherwise it would be very difficult to understand the real linguistic necessities of these persons.

Another important recommendation is to have enough contacts in the aviation field, as to be able to start working directly with the civil aviation training centers (CATC), flight training operators (FTO), air navigation services providers (ANSP), airlines or civil aviation authorities (CAA).

In my case, it would have been very difficult or maybe impossible to get all the information presented in this study if I would have not been working for these organizations.

Talking about teaching alternatives, I recommend as the best option the preparation of materials working jointly, language teachers and subject matter experts, because in this field the best motivating factor for students is to work on topics related to aviation, and that is why I consider this factor as vital to obtain the training objectives.

It is also advisable to review the electronic information available at the attached CD-Rom at the end of this thesis, which contains very important information that is used mainly in the field of Air Traffic Control (*Appendix 6: CD Rom contents*).

This electronic information is especially useful for Aviation English teachers who are not familiar with the context where these examinations were performed.

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APPENDIX 1: ICAO Rating Scale

(Part 1)

LEVEL	PRONUNCIATION *Assumes a dialect and/or accent intelligible to the Aeronautical community.*	STRUCTURE *Relevant grammatical structures and sentence patterns are determined by language functions appropriate to the task.*	VOCABULARY
EXPERT 6	Pronunciations, stress, rhythm, and intonation, though possibly influenced by the first language or regional variation, almost never interfere with understanding.	Both basic and complex Grammatical structures and sentence patterns are consistently well controlled.	Vocabulary range and accuracy are sufficient to communicate effectively on a wide variety of familiar and unfamiliar topics. Vocabulary is idiomatic, nuanced, and sensitive to register.
EXTENDED 5	Pronunciation, stress, rhythm, and intonation, though influenced by the first language or regional variation, rarely interfere with understanding.	Basic grammatical Structures and sentence patterns are consistently well controlled. Complex structures are attempted but with errors which sometimes interfere with meaning.	Vocabulary range and accuracy are sufficient to communicate effectively on common, concrete, and work related topics. Paraphrases consistently and successfully. Vocabulary is sometimes idiomatic.
OPERATIONAL LEVEL 4	Pronunciation, stress, rhythm, and intonation are influenced by the first language or regional variation, but only sometimes interfere with understanding.	Basic grammatical Structures and sentence patterns are used Creatively and are usually well controlled. Errors may occur, Particularly in unusual or Unexpected Circumstances, but rarely Interfere with meaning.	Vocabulary range and accuracy are usually sufficient to communicate effectively on common, concrete, and work related topics. Can often paraphrase successfully when lacking vocabulary in unusual or unexpected circumstances.

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ICAO Rating Scale

(Part 2)

LEVEL	FLUENCY	COMPREHENSION	INTERACTIONS
EXPERT 6	Able to speak at length with a natural, effortless flow. Varies speech flow for stylistic effect, e.g. to emphasize a point. Uses appropriate discourse markers and connectors spontaneously.	Comprehension is consistently accurate in nearly all contexts and includes comprehension of linguistic and cultural subtleties.	Interacts with ease in nearly all situations. Is sensitive to verbal and non-verbal cues, and responds to them appropriately.
EXTENDED 5	Able to speak at length with relative ease on familiar topics, but may not vary speech flow as a stylistic device. Can make use of appropriate discourse markers or connectors.	Comprehension is accurate on common, concrete, and work related topics and mostly accurate when the speaker is confronted with a linguistic or situational complication or an unexpected turn of event. Is able to comprehend a range of speech varieties (dialect and/or accent) or registers.	Responses are immediate, appropriate, and informative. Manages the speaker/listener relationship effectively.
OPERATIONAL LEVEL 4	**Produces stretches of language at an appropriate tempo. There may be occasional loss of fluency on transition from rehearsed or formulaic speech to spontaneous interaction, but this does not prevent effective communication. Can make limited use of discourse markers or connectors. Fillers are not distracting.**	**Comprehension is mostly accurate on common, concrete, and work related topics when the accent or variety used is sufficiently intelligible for an international community of users. When the speaker is confronted with a linguistic or situational complication or an unexpected turn of events, comprehension may be slower or require clarification strategies**	**Responses are usually immediate, appropriate, and informative. Initiates and maintains exchanges even when dealing with an unexpected turn of events. Deals adequately with apparently misunderstandings by checking, confirming or clarifying.**

Note. – The Operational Level (Level 4) is the minimum required proficiency level for radiotelephony communication. Levels 1 through 3 describe Pre-elementary, Elementary, and Pre-operational levels of language proficiency respectively, all of which describe a level of proficiency below the ICAO language proficiency requirement. As a whole, the scale will serve as benchmarks for training and testing, in assisting candidates to attain the ICAO Operational Level (Level 4).

APPENDIX 2: ICAO Holistic Descriptors

Proficient speakers shall:

a. communicate effectively in voice-only (telephone/radiotelephone) and in face-to-face situations;

b. communicate on common, concrete and work-related topics with accuracy and clarity;

c. use appropriate communicative strategies to exchange messages and to recognize and resolve misunderstandings (e.g. to check, confirm, or clarify information) in a general or work-related context;

d. handle successfully and with relative ease the linguistic challenges presented by a complication or unexpected turn of events that occurs within the context of a routine work situation or communicative task with which they are otherwise familiar; and

e. use a dialect or accent which is intelligible to the aeronautical community.

TEST NUMBER: 2008-00001

DATE: SEPTEMBER 11TH, 2008

TEST TAKER CODE: **010**

Instructions for Interlocutors and Raters

Bellow you have the structure of this TOEFA examination. The tasks should be shared according to the topics, where the Linguistic Interlocutor/Rater should perform the tasks where plain English is used and the Operational Interlocutor/Rater should perform the tasks related to the aviation context (aviation topics and standardized English phraseology).

The scoring should be made according to the holistic descriptors and the linguistic descriptors of the ICAO Rating Scale. Please check the space in parentheses as you advance with the questions.

a) **Introduction and rapport establishment**.- The interlocutor/raters will introduce themselves and explain briefly the aim, duration and procedures of the test to the test-taker.   **(2 min.)**

   (It is not necessary to ask for detailed personal information about the test-taker, because it has been previously obtained from official sources).

b) **TASK I**: **Open questions**: Evaluate pronunciation, structure, vocabulary and fluency.

   The interlocutors/raters (in this case both persons perform both functions, at different times) ask open questions to the candidate, allowing some seconds time to answer them. Remember that this is a face-to-face interview, so the interview should be as natural as possible.

( ) Question 1. Will you please tell me your background as an air traffic controller? **(30 seconds)**

( ) Question 2. Will you please tell me your main functions as an area controller? **(1 min. 30 sec.)**

( ) Question 3. Will you please give me your comments about the new reduction in the vertical separation minimum (RVSM) scenario? **(2 min.)**

Sub-question: Don't you think that this reduction could be dangerous for air traffic control service?

( ) Question 4. What is the role of training in the life of an air traffic controller? **(2 min.)**

Sub-question: What about your refresher or recurrent courses?

( ) Question 5. Could you mention any experience you had related with an ATC incident? **(5 min.)**

Sub-question: Why do you think pilots and air traffic controllers sometimes omit accomplishing with the read back procedure?

Sub-question: Do you think that it is necessary for a pilot or air traffic controller to know the plain English language or it is just enough to know the English proficiency?

c) **TASK II**: **Stating your own idea about a situation**. - Evaluate interactions as responses to unexpected turn of events.

Candidates see a picture of an aviation non-routine situation and have to describe and respond to a question related to the picture. Sample questions are as follows:

Now I will show some pictures to you.

Picture 1. Please describe what you see in this picture. **(2 min.)**

Sub-question: Will you please tell me what procedure you use when you have a radio communication failure situation?

Picture 2. What do you think that is happening in this situation?
(2 min.)

Sub-question: What is the importance of meteorology in aviation?

d) **TASK III**: **Comprehension practice**. - Evaluate comprehension.

Candidates listen to a previously recorded aviation situation (news, conversations, explanations, etc.) and after listening to it only once; they have to retell what they have understood, as to judge their listening proficiency when exposed to different accents of the English language, in this case produced by means of non-verbal clues. The same task is repeated three times, with different audios. **(10 min.)**

Audio 1: Brazil accident (1 minute 30 seconds).

Audio 2: Baseball player aviation accident (45 seconds).

Audio 3: Serious fatigue for working too many hours (45 seconds).

e) **Closing of the interview**. - The assessors thank the candidate for his/her participation on the test and tell him/her when and where to look for the results, according to what has been previously established by the institution or the civil aviation authority.
(2 minutes)

Total Test Time: approximately 30 minutes

APPENDIX 4: TOEFA Scoring Sheet

Test-taker name		Organization or company	
Operational background		Date	
License Number		Tester	

Reference documents:
ICAO Rating Scale
Holistic Descriptors
Both of the above items are described in more detail in the *Manual on the Implementation of the ICAO Language Proficiency Requirements* — Doc 9835
ICAO Annex 1

Instructions:

1. During the test there must be sufficient *interaction* with the test-taker to evaluate properly all six criteria that are rated. The ability of the test-taker to adequately manage communications in unusual or unexpected situations and adequate aviation-related English proficiency must be evaluated.

2. Close reference must be made to the ICAO Rating Scale when scoring the test. The Rating Scale provides detailed descriptions of the six criteria.

3. The overall score represents the **lowest** score among the individual scores.

Pronunciation	Structure	Vocabulary	Fluency	Comprehension	Interactions	OVERALL *(Lowest score among individual scores)*

APPENDIX 5: TOEFA Procedures

Introduction

The examination **TOEFA (Test of English for Aviation)** has been developed to judge the competencies in the English language of Pilots, Air Traffic Controllers, and Aeronautical Station Operators, in the specific abilities of speaking and understanding this foreign language and according to the standards established in the Rating Scale of the International Civil Aviation Organization (ICAO) and its holistic and linguistic descriptors.

It is important that test-takers have already read the ICAO Document 9835: Manual on the Implementation of ICAO Language Proficiency Requirements, in order to be aware of all the details of this very relevant international standard as well as the main characteristics of the TOEFA examination.

Procedures for the Day of the Examination

This is an individual examination that consists in an interview between the rater(s) and the candidate. The interviews should be scheduled at 30 minutes intervals. There should be a time space of at least 60 minutes for lunch, depending on the quantity of people to evaluate and the estimated time to finish the daily interviews.

It is necessary to apply the interviews in an appropriate place, like a small office, with a desk and enough chairs for the Rater(s) and the test-taker, as well as near power outlet in order to work with the equipment to play the audio files.

It is very important that the place where the individual interviews will be developed should be a quiet place and free of noises that could distract the raters or test-takers or interrupt some of the tasks of the examination, especially the listening part.

It is also important to verify the correct functioning of all the necessary equipments (voice recorder, audio player, etc.) before the beginning of the examination.

Results Delivery

The results are delivered by electronic means after 48 hours of the end of the mission, starting from the moment when the Expert have already returned to his country, through a Final Report. All the recordings are property of the Air Navigation Services Providers.

It is advisable that all the test-takers should have knowledge of their results, so this information can be useful as individual feedback and since they will know the detailed information about the linguistic descriptors that they should optimize, it will be excellent information for the application of their training strategies in order to accomplish with the ICAO language proficiency requirements as soon as possible.

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APPENDIX 6: CD Rom Contents

As an additional information, there is a CD Rom attached at the end of this document, with very important electronic information that is used mainly in the field of Air Traffic Control.

This information is useful for a better understanding of the theoretical concepts mentioned in this thesis. There are also samples of interviews developed according to ICAO language proficiency requirements, as well of samples of pictures and aviation related audios used during these interviews.

The electronic material available in this CD Rom is as follows:

    a) File with three (3) interview samples;

    b) File with twenty five (25) picture samples;

    c) File with ten (10) audio samples;

    d) ICAO Document 4444;

    e) ICAO Document 9835;

    f) ICAO Circular 318;

    g) ICAO Circular 323.

    h) Thesis PDF version

This electronic information will be especially useful for Aviation English teachers who are not familiar with the context where these examinations are usually performed.